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## İÇİNDEKİLER

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Nesibe Aydın Eğitim Kurumları tarafından yayımlanan *Eğitim ve Gelecek Dergisi* on ikinci sayısında sizinle buluşuyor. Eğitim ve Gelecek Dergisi'nin **Emerging Sources Citation Index (ESCI)** tarafından da dizinlenmesiyle dergimize olan ilgi her geçen gün daha da artmaktadır.

Dergimizin on ikinci sayısında yer alan çalışmaları siz değerli okurlarımıza sunuyoruz.

**Derya Yıldız, Tuğba Özkaral ve Mustafa Yavuz** tarafından hazırlanan ***"Türkçe - Teknoloji - Sanat - Sosyal Bilgiler (2t2s): Bütünleşik Öğrenme Uygulaması"*** başlıklı çalışmanın amacı, 7. sınıf düzeyindeki iletişim öğrenme alanında bütünleşik öğrenme ile tek disipline dayalı öğrenmenin öğrencilerin akademik başarılarına etkisini karşılaştırmaktır. Çalışma, hem nitel yaklaşımı hem de nicel yaklaşımı içeren açıklayıcı karma yöntem kullanılarak yapılmıştır. Çalışmanın sonunda deney grubunda yapılan bütünleşik 2T2S öğrenmeye göre gerçekleştirilen etkinliklerin kontrol grubunda yapılan tek disipline dayalı öğrenmeye göre daha etkili olduğu sonucuna ulaşılmıştır.

Günümüzde öğrenen ve öğreten bireylerin dijital okuryazarlık becerilerini geliştirmek oldukça önemlidir. **Mutlu Tahsin Üstündağ, Erhan Güneş ve Eralp Bahçivan** tarafından hazırlanan ***"Dijital Okuryazarlık Ölçeğinin Türkçeye Uyarlanması ve Fen Bilgisi Öğretmen Adaylarının Dijital Okuryazarlık Durumları"*** başlıklı çalışmaya 13 devlet üniversitesinden 3. ve 4. sınıfta okuyan 979 fen bilgisi öğretmen adayı katılmıştır. Araştırmanın bulguları, fen bilgisi öğretmen adaylarının dijital okuryazarlık becerilerinin genel olarak iyi olduğunu göstermektedir.

Gelişmekte olan ülkelerin eğitim sistemlerinde Bilişim Teknolojileri (BT) entegrasyonu gittikçe önemli bir hale gelmektedir. **Ekmel Çetin ve Ebru Solmaz** tarafından hazırlanan ***"BT Entegrasyonu Eğitim için Sihirli Bir Değnek mi? Singapur ve Türkiye Karşılaştırmalı Tarihsel Analizi"*** başlıklı çalışmada, Singapur ve Türkiye'nin eğitim alanında uluslararası değerlendirme sonuçları sunulmuş ve iki ülkenin eğitimde BT entegrasyonu geçmişi karşılaştırılarak incelenmiştir.

Teknoloji eğitimin önemli unsurlarından biridir. Günümüzde, sadece üniversite öğrencileri değil, dil öğretimi de teknolojinin sürekli gelişmesi ile ilişkilidir. **Zeynep Munzur** tarafından hazırlanan ***"Bilgi Teknolojileri ile Geliştirilmiş İngilizce Okuma Derslerinin Öğrencilerin Öğrenme ve Başarıları Üzerindeki Etkileri"*** başlıklı çalışmada, Kadir Has Üniversitesi Yabancı Diller İngilizce Hazırlık Programı'ndaki öğrencilerin teknoloji ile geliştirilmiş okuma derslerine olan tutumları incelenmiştir. Araştırma sonunda, uygun ve yeterli bilgi teknolojileri okuma derslerinin içeriğine uygulandığında, öğrencilerin okuma derslerine olan tutumlarının olumlu yönde değiştiği tespit edilmiştir.

**Suat Çelik, Türkan Karakuş, Engin Kurşun, Yüksel Göktaş ve Mevlüt Özcan** tarafından hazırlanan ***"Teknoloji Destekli Öğrenme Ortamlarında Öğretmenler ve Öğrencilerin Karşılaştığı Pedagojik Problemler: FATİH Projesi Örneği"*** başlıklı çalışmanın amacı FATİH Projesinin pilot uygulamasına katılan öğretmen ve öğrencilerin;

öğretmenler, öğrenciler ve okul müdürlerinin bakış açısından karşılaştıkları pedagojik sorunları araştırmaktır. Araştırma bulguları, öğretmenlerin sınıf yönetiminde zorluk çektiklerini, sınıftaki lider rollerini kaybettiklerini, bilgi ve iletişim teknolojilerinin entegrasyonu ile birlikte öğrencileriyle olan iletişim ve etkileşimlerini kaybettiklerini göstermektedir.

İnsanların öğretmenleri nasıl algıladıkları, onların birebir, yüz yüze etkileşmişlerinin yanı sıra internetteki etkileşimleri ile de ilişkilidir. **Burhanettin Keskin** tarafından hazırlanan ***"Öğretmenlerle İlgili YouTube Videolarının Analizi"*** başlıklı çalışmada öğretmenlerle ilgili YouTube videolarında öğretmenlerin nasıl sunulduğu incelenmiştir. Çalışmada, YouTube (www.youtube.com) arama motoruna "öğretmen" kelimesi yazılarak elde edilen ilk üç sonuç sayfasındaki 60 video incelenmiştir. Çalışmanın sonunda, incelenen videoların çoğunda öğretmenlerin olumsuz bir şekilde sunulduğu tespit edilmiştir.

**Hüseyin Akar ve Mehmet Üstüner** tarafından hazırlanan ***"Öğretmen Adaylarının Duygusal Zekâ ve Sosyal Girişimcilik Özellikleri Arasındaki İlişkide Öz Yeterlik Algılarının Aracılık Rolü"*** başlıklı çalışmada öğretmen adaylarının duygusal zekâ düzeyi, öz yeterlik algısı ve sosyal girişimcilik özellikleri arasında pozitif yönde anlamlı ilişkiler olduğu görülmüştür. Ayrıca öğretmen adaylarının duygusal zekâ düzeyi ile sosyal girişimcilik özellikleri arasındaki ilişkide öz yeterlik algısının kısmi aracılık rolüne sahip olduğu tespit edilmiştir.

Yükseköğretim ortamlarında proje temelli yaklaşıma yönelik gittikçe artan bir eğilim oluşmuştur. **Mustafa Şat** tarafından hazırlanan ***"Lisans Öğrencileri İçin Proje Derslerinde Verilen Biçimlendirici Geri Bildirim Algı Ölçeğinin Geliştirilmesi ve Geçerliği"*** başlıklı çalışmada geliştirilen ölçek, grup çalışmasına dayalı çeşitli öğrenme ortamlarında öğrencilerin biçimlendirici geri bildirim algılarını ölçmek için araştırmacılara, uygulayıcılara ve akademisyenlere yarar sağlayıcı niteliktedir.

Mesleğe yeni başlayan aday öğretmenlerin yaşadığı sorunların çözümünde mentörlüğün yardımcı olacağı söylenebilir. **Funda Nayır ve Saadet Kuru Çetin** tarafından hazırlanan ***"Aday Öğretmenlerin Danışman Öğretmenlik Uygulamasına İlişkin Görüşleri (Muğla İli Örneği)"*** başlıklı çalışmanın amacı yeni atanan aday öğretmenlerin 24 hafta boyunca sınıfta danışman öğretmenleriyle uygulayacakları etkinliklerin aday öğretmenlerin mesleki becerilerine sağladığı katkıyı ve aday öğretmenlerin bu uygulama ile ilgili görüşlerini ortaya çıkarmaktır. Araştırma bulgularına göre aday öğretmenlerin birçoğu, mentörlük uygulamasının yararlı olduğunu düşünmekte, bu uygulamanın bazı düzeltmelerle devam etmesini istemekte ve uygulama sürecinde mentör seçiminin önemine vurgu yapmaktadır.

**Gönül Yazgan-Sağ ve Elçin Emre-Akdoğan** tarafından hazırlanan ***"Ortaöğretim Matematik Öğretmen Adaylarının Ders Planı Bilgilerindeki Değişimin Analizi"*** başlıklı çalışmada ortaöğretim matematik öğretmen adaylarının "Özel öğretim yöntemleri" dersinde matematik ders planı bilgilerini nasıl geliştirdiklerini incelemek amaçlanmıştır. Elde edilen bulgular ışığında; dersin başında, bazı öğretmen adaylarının matematik ders planı ile öğretim programı arasındaki farkları ayırt edemedikleri görülürken dersin sonunda öğrencilerin

anlamaları ve motivasyonlarını göz önünde bulundurarak öğretim sürecini nasıl organize edeceklerine yönelik ayrıntılı açıklamalar yaptıkları tespit edilmiştir.

Küçük yaşta müzik eğitimine başlayan Ludwig von Beethoven, olağanüstü yeteneğiyle ve aldığı eğitimle klasik döneme adını yazdıran besteciler arasında yer almıştır. Klasik dönemin ve klasik dönemden romantik döneme geçişin en önemli ve verimli bestecilerinden olan Beethoven zamanının müzik kuramlarına daha yenilikçi yaklaşmış, müziğiyle gerek armoni, form, modülasyon kavramlarına yenilikler getirmiştir. **Halil Levent Kuterdem** tarafından hazırlanan ***"Beethoven Op 110 Piyano Sonatı Birinci Bölüm Tema ve Geçiş Bölgelerindeki Modülasyonların Kurulumu"*** başlıklı çalışmada kompozisyon materyalinde önemli ögelerden olan kontrast kavramı, op 110 piyano sonatının modülasyon bölgelerinde nasıl sağlandığı ve piyano eğitiminde gerekliliğine ışık tutmaktadır.

*Eğitim ve Gelecek Dergisi* olarak gösterdiğiniz ilgi ve değerli katkılarınız için teşekkür ediyorum.

Gelecek sayıda buluşmak üzere…

**Prof. Dr. Erten GÖKÇE**

**Eğitim ve Gelecek Dergisi Baş Editörü**

**Editorial**

*Journal of Education and Future* published by Nesibe Aydın Education Institutions, meets you with the twelfth issue. The interest in JEF is increasing day by day with the success of *JEF* being indexed by **Emerging Sources Citation Index (ESCI)**.

We present the studies in the twelfth issue of JEF to our valuable readers.

In the article titled ***"Turkish – Technology – Art - Social Studies (Tsta): Integrated Learning Application"***, which is prepared by **Derya Yıldız, Tuğba Özkaral and Mustafa Yavuz**, it is aimed to compare the effects of the learning based on integrated learning and learning based upon a single discipline in communication learning domain at the level of grade 7. In the research, the descriptive mixed method including both qualitative and quantitative approaches was employed. According to the findings, it was detected that the students in the experimental group made more explanatory sentences in comparison with the students in the control group.

Today, it is important for the 21st century humanity to develop digital literacy skills. In the article titled ***"Turkish Adaptation of Digital Literacy Scale and Investigating Pre-service Science Teachers' Digital Literacy"***, which is prepared by **Mutlu Tahsin Üstündağ, Erhan Güneş and Eralp Bahçivan**, it is aimed to adapt the digital literacy scale developed by Ng (2012) into Turkish and to investigate pre-service science teachers' digital literacy. 979 junior and senior pre-service science teachers from 13 state universities participated in the research. According to the findings of the study, the digital literacy skills of pre-service science teachers seem generally qualified.

Information and Communication Technologies (ICT) integration has become increasingly important in educational systems of developing countries. The article titled ***"Is ICT Integration A Magic Wand for Education? A Comparative Historical Analysis between Singapore and Turkey"***, which is prepared by **Ekmel Çetin and Ebru Solmaz**, presents the international assessment results of Singapore and Turkey in case of education and compares the histories of ICT integration in education process of these two countries.

Technology is considered one of the most important aspects of education. Today not only college education, but also language teaching is being challenged by the development of technology. The article titled ***"Impacts of Technology Enhanced EFL Reading Classroom on Student Learning and Achievement"***, which is prepared by **Zeynep Munzur**, presents students' attitudes to technology enhanced reading classroom, and its effects on their academic achievement at Kadir Has University School of Foreign Languages English Preparatory Program. The result of the study shows that if appropriate technology is integrated into reading lessons, the students seem to reflect a positive attitude towards reading.

In the article titled ***"Pedagogical Problems Encountered by Teachers and Students in Technology-Enhanced Learning Environments: A Case of FATIH Project"***, which is prepared by **Suat Çelik, Türkan Karakuş, Engin Kurşun, Yüksel Göktaş and Mevlüt**

**Özcan**, it is aimed to investigate pedagogical problems encountered by teachers and students, who participated in pilot implementation of the Increasing Opportunities Improving Technology Movement (FATIH) project, from the perspective of teachers, students and schools school principals. Findings of the study show that teachers had difficulty in classroom management, they lost their leader role, communication and interaction with their students after integration of information and communication technologies.

The way people perceive teachers is closely linked to the way teachers are represented through interactions that take place in-person, as well as interactions that take place online. In the article titled ***"An Analysis of YouTube Videos about Teachers"***, which is prepared by **Burhanettin Keskin**, it is aimed to evaluate YouTube videos concerning teachers in terms of how teachers are portrayed. In the study, the keyword "teacher" is searched on the YouTube search engine (www.youtube.com) and the first 60 videos (3 pages) were analyzed. The results of this study show that most of the videos examined portray the teacher in a negative manner.

In the results of the article titled ***"Mediation Role of Self-Efficacy Perceptions in the Relationship between Emotional Intelligence Levels and Social Entrepreneurship Traits of Pre-Service Teachers"***, which is prepared by **Hüseyin Akar and Mehmet Üstüner**, statistically significant relationships with positive correlation were found between self-efficacy, emotional intelligence of pre-service teachers, and social entrepreneurial characteristics. In addition, self-efficacy perception was found to be a partial moderator role between social entrepreneurship characteristics and emotional intelligence level of pre-service teachers.

There has been an increasing trend towards project-based approach in higher education. In the article titled ***"Development and Validation of Formative Feedback Perceptions Scale in Project Courses for Undergraduate Students"***, which is prepared by **Mustafa Şat**, the presented new scale will serve as a useful tool for researchers, practitioners and individuals in higher education in order to assess students' formative feedback perceptions in various work-based and experiential learning environments.

Especially, the inadequacy of theoretical information in practice increases the problems experienced by teacher candidates during the first years when they start the profession. In the article titled ***"Opinions of Teacher Candidates on Mentor Teacher Program (Example of Muğla)"***, which is prepared by **Funda Nayır and Saadet Kuru Çetin**, it is aimed to identify the contribution to the professional skills of the newly appointed teachers of the National Education of their activities conducted in class with their mentor teachers for 24 weeks, and the views of teacher candidates on such implementation. According to the findings, the majority of the teacher candidates finds the mentorship implementation helpful and wants it to continue after some reforms.

In the article titled ***"Analysis of the Changes in Prospective Secondary Mathematics Teachers' Knowledge of Lesson Plan"***, which is prepared by **Gönül Yazgan-Sağ and Elçin Emre-Akdoğan**, it is aimed to investigate how prospective mathematics teachers'

develop their knowledge of mathematics lesson plan in a Teaching methods course. According to the findings, in beginning of the course, although some of the prospective mathematics teachers confused mathematics lessons plan with mathematics curriculum after the course, they gave detailed information about how to organize an instructional process considering students' motivation and understandings.

Started his musical training at an early age, Ludwig van Beethoven has become one of the composers who made his mark in the classical period with his extraordinary skills and training. The article titled ***"Configuration of Modulations in Theme and Transition Sections in Beethoven Op 110 Piano Sonata Part One"***, which is prepared by **Halil Levent Kuterdem**, shed light to how the contrast concept which is considered as one of the important elements in composition material is used in modulation sections of Op 110 Piano Sonata and its necessity in piano training.

*Thanks for your interest and valuable contributions for Journal of Education and Future*.

Look forward to meeting in the next issue…

**Prof. Dr. Erten GÖKÇE**

***Editor in Chief of***

***Journal of Education and Future***

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# Turkish – Technology – Art - Social Studies (Tsta): Integrated Learning Application

**Derya Yıldız**[*] **Tuğba Özkaral**[**] **Mustafa Yavuz**[***]

## Abstract

The purpose of this research is to compare the effects of the learning based on integrated learning and learning based upon a single discipline in communication learning domain at the level of grade 7. In the research, the descriptive mixed method including both qualitative and quantitative approaches was employed. The study population of the research consisted of the grade 7 students of a secondary school in Konya province in 2015-2016 academic year. While a single discipline-based learning was applied in the control group, integrated Turkish, Social Studies, Technology Design and Art learning was applied in the experimental group. The integrated learning enables meaningful connections between different subject areas, enabling learners to learn effectively in a multidimensional way.In communication learning domain, it was determined that the activities conducted on the experimental group according to integrated TSTA learning were more effective than learning based on a single discipline which was conducted on the control group. When the answers given by the students to the achievement test were compared, it was detected that the students in the experimental group made more explanatory sentences in comparison with the students in the control group, their answers included samples from different domains related to communication and the students were able to integrate these domains with each other.

***Keywords:*** integrated learning, learning based on a single discipline, communication, Turkish education, social studies

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# Türkçe – Teknoloji – Sanat - Sosyal Bilgiler (2t2s): Bütünleşik Öğrenme Uygulaması

## Öz

Bu çalışmanın amacı, 7. sınıf düzeyindeki iletişim öğrenme alanında bütünleşik öğrenme ile tek disipline dayalı öğrenmenin öğrencilerin akademik başarılarına etkisini karşılaştırmaktır. Araştırma, deneme modellerinden ön test-son test kontrol gruplu modele göre desenlenerek gerçekleştirilmiştir. Çalışma, hem nitel yaklaşımı hem de nicel yaklaşımı içeren açıklayıcı karma yöntem kullanılarak yapılmıştır. Araştırmanın çalışma grubunda, 2015-2016 eğitim-öğretim yılında Konya il merkezinde bulunan bir ortaokulun 7.sınıf öğrencileri bulunmaktadır. Araştırmanın kontrol grubunda tek disipline dayalı öğrenme gerçekleştirilirken deney grubunda ise bütünleşik Türkçe, Sosyal Bilgiler, Teknoloji Tasarım ve Sanat (2T2S) öğrenme uygulaması yapılmıştır. Bütünleşik öğrenme, farklı konu alanları arasındaki anlamlı bağlantılarla öğrencilerin etkili öğrenmelere imkân vererek öğrenmenin çok boyutlu olarak gerçekleşmesini sağlar. Çalışmada yapılan uygulama sonucunda "iletişim" öğrenme alanında deney grubunda yapılan bütünleşik 2T2S öğrenmeye göre gerçekleştirilen etkinliklerin kontrol grubunda yapılan tek disipline dayalı öğrenmeye göre daha etkili olduğu sonucu tespit edilmiştir. Her iki gruptaki öğrencilerin başarı testindeki sorulara verdikleri cevaplar karşılaştırıldığında deney grubundaki öğrencilerin kontrol grubundaki öğrencilere kıyasla verdikleri cevaplarında daha açıklayıcı ifadelere yer veren cümleler kurdukları, cevaplarının iletişimle ilgili farklı alanlardan örnekler içerdiği ve öğrencilerin bu alanları birbirleriyle bütünleştirebildikleri tespit edilmiştir. Uygulamanın sonunda görüşleri alınan öğretmenler, bütünleşik öğrenmenin farklı disiplinleri bütünleştirerek hayatın çok yönlü halini sınıf ortamına taşıdığını ve öğrencilerin öğrenmelerinin daha etkili olduğunu ifade etmişlerdir.

***Anahtar Sözcükler:*** bütünleşik öğrenme, tek disipline dayalı öğrenme, iletişim, Türkçe eğitimi, sosyal araştırmalar

## Introduction

This education, which is known as STEM (Science, Technology, Engineering, Mathematics) in English is being applied in the U.S.A. and some other countries, has not been studied enough in our country yet. Whereas integrated learning is also very important for social sciences in order to raise individuals who acquire skills such as problem solving, critical thinking, and teamwork. It is necessary to provide different educations for teachers and students in order to cope with the problems of today's world and to compete on a global scale. Thus, reconstruction and rearrangement is needed in our country, especially in curricula and in many issues. STEM may be identified in different ways by educators who try to design programs and lessons that improve learning of students. It is seen that some educators are trying to integrate their STEM topic knowledge in order to compose deeper understanding. It is anticipated that students may transfer into their future technical and scientific careers and might lead better lives (Fan & Ritz, 2014). In other words, STEM education is the content of knowledge, skills and beliefs which is formed collaboratively at the intersection, rather than a STEM subject area (Çorlu, Capraro & Capraro, 2014). According to Foucolut (1999), science does not change and remove current applications.

Yavuz (2015) states that different disciplines do not penetrate into each other efficiently in school environment and they are not included at the desired level in a circle whose center is the real life, and draws attention to the New Generation School (NGS) involving "Integrated Learning Domains". When native language and social studies curricula of different countries are examined, it is seen that connection among lessons is considered to be important. In the curricula within the content of social studies; for example in Turkey, relating to lessons such as Turkish, mathematics, science and technology (Ministry of National Education, 2005); in Canada Ontario, inter-curricular integrated learning(Ministry of Education Ontario, 2013); in Estonia, relationships to skills of other subject areas such as mathematics, national language, foreign language, natural sciences, technology, fine arts (Republic of Estonia Ministry of Education and Research, 2011); in People's Republic of China Hong Special Administrative Region, association between different domains and lessons (The Curriculum Development Council Hong Kong, 2011); in Australia, the use of knowledge and skills acquired in other domains such as English, mathematics and science(Australian Curriculum Assessment and Reporting Authority, 2010) are emphasized.

Within the framework of information expressed above, this research aims a learning in which multiple domains such as Turkish, Technology and Design, Art(Visual Arts, Music) , Social Studies integrate and teachers of these domains collaboratively teach these subjects in an integrated way in classroom environment. In line with this purpose, attainment and activity samples in the content of "Communication" learning domain were prepared. As it is known, the issue of communication is not only a discipline or domain, but it includes multiple domains as in many other subjects. Communication is not simply the whole of crumbs of information between two individuals at a certain time (Birdwhistell, 1990).

## 4 TURKISH – TECHNOLOGY – ART - SOCIAL STUDIES (TSTA): INTEGRATED LEARNING APPLICATION

Communication is the whole of intellectual and relational activities which is the compulsory condition for a person to produce and develop his/her biological, psychological and social existence (Erdoğan, 2011). In other words, it is the most important factor which enables a person's transformation from a biological being into a social being. Beginning from early childhood, understanding other people and getting information which would prepare a person for the world comes true through communication (Tuna, 2012). On the other hand, means of communication providing flow of information continue developing day by day.

The issue of communication is highlighted in mother tongue lesson curricula in the world and the transformation of communication into applications in different domains is emphasized. In Finnish Mother Tongue and Literature Curriculum (2004: 51), communication and interaction skills have been particularly purposed.

*"- Functional, appropriate for the purpose, ethics; they will gain practice in order to be individuals who can communicate effectively, speak, read, write in school and various communication environments, -They will try to maintain suitable environments for communication, become accustomed to the awareness that interaction has different ways and there are different perspectives."* In Australian English Curriculum (2012: 1): multi-directional communication is emphasized and communication skills are included in different learning domains: *"Understanding, using English language with its all varieties, gaining competence in expressing feelings, making interaction easier, effective thinking, gaining persuasive skill and discussing", "Speaking standard Australian English- comprehending the use of its written forms and non-linguistic forms in communication in getting a meaning".* In the Language Curriculum of Canada Ontario State (2006: 4), *"Using language for the interaction of individuals and communities, using language for personal development and the active participation as a citizen of the world"* is aimed, communication is pointed out by underlining the multicultural and very different world. *"Reinforcing students' communication through knowledge and opinions, focusing on their learning at school, in the multicultural and world".* In Turkish Lesson Curriculum (2015: 32) which is going to be applied in 2016-2017 academic year: the attainments of *"They notice different points of view in conversation/discussion. In order to transfer information better, they support their speech/presentation in appropriate situations with multimedia devices such as graphics, visuals and so on. They form an opinion about what they listen/watch"* are included in verbal communication learning domain.

Some examples of attainments which are formed by integrating Turkish, Technology and Design, Art (Visual Arts, Music), Social Studies lessons are given below:

*1. They notice and explain visual, written and verbal dimensions of communication. They express the communication media in their lives.*

*2. They share their products that they prepare in written, verbal, visual and electronic environments by using media devices.*

*3. Considering the development of communication technologies, they prepare presentations displaying the role of art in communication.*

*4. They explain and exemplify the effect of the culture of the environment where they live on communication environments.*

*5. They compare their culture with the ways of communication, signs or situations in other cultures.*

*6. They express their feelings and thoughts through pictures, photos, writing, signs, songs, notes or other ways of art.*

**Integrated TSTA Learning Applied to the Experimental Group**

Integrated learning enables students to use their creativity through integration which is based on using different fields together in the learning environment. Aybek (2001: 1) describes integrated learning as "an approach which helps students combine, integrate knowledge from different fields and enables students to focus on thinking at the level of analysis and synthesis via concepts. According to Jacobs (1989), integrated learning is "the understanding which uses methods and knowledge of multiple disciplines consciously.

In integrated learning, students better learn connections among events, facts, concepts and ideas clearly and they can build new and different information on them easily by learning how to make deeper connections across disciplines from different perspectives (Bean, 1990; Cited in: Mcdonald and Czerniak, 1994).

In integrated learning, a particular concept (or a problem, an issue) is used as base, knowledge and skills which might give insights into this concept from different perspectives are integrated by collecting from related fields. Here, the main purpose is to examine the concept which constitutes the topic of a lesson. Besides, it is important in this process to learn knowledge and skills of various learning domains related to the concept (Yıldırım, 1996).

Lucas (1981) states that individuals perceive the external world in an integrative way and multiple learning domains form a meaningful pattern in this integration. The ability of students to integrate knowledge from different fields is crucial in order to gain higher level thinking skills such as critical and creative thinking. In this way, knowledge learned by students can be transferred to daily life.

In the learning applied to the experimental group, lessons were integrated and the purpose was to enable students to learn about communication in a multi-directional way. In order to form the integrated curriculum, the researchers

cooperated with the teachers of Turkish, Technology and Design, Social Studies and Art (Music, Visual Arts).

Attainments were written based on the necessity that these lessons need to be studied by integrating in order to provide meaningful learning in terms of communication. The lessons were studied in the frame of prepared activities in order to acquire these written attainments. The lessons were carried out by the teachers together within the lesson plan instructions.

Examples related to integrate TSTA learning activities conducted in the experimental group are given below:

- Students share their writing, visual and auditory products that they form related to a book they have read, a film they have watched, a musical piece they have listened, a work of art they have seen or an event they have experienced by using them together (short film, photograph, music, animation, etc.) by means of technological environments (blogs, social networking sites, etc.) (2nd attainment) (6th attainment)

- With reference to photographs and pictures showing situations which prevent communication in their environment and at the international level, they design dialogues indicating solutions. (4th attainment) (5th attainment).

- Trips to photograph and art exhibitions and technology and science museums are organized, music activities are done. (3rd attainment) (5th attainment)

- Choosing an event that they have experienced in their daily lives, role plays reflecting different viewpoints of people in this event are performed. (1st attainment) (4th attainment) (6th attainment)

- Students choose one of the works in the museums, they get answers to questions such as “When was it made? Which civilization does it belong to? Where was it made? Why was it made? Why does it maintain its importance today? Where was it found? How did it arrive at the museum?, and afterwards they try to find out the symbols that the work has, whether it provides information and clues related to the period and civilization where it was made, tales or legends related to the symbols if any. They create visual designs by looking at the work they investigate. In this regard, tiles; miniatures, murals, motives of carpets-rugs, kerchiefs are employed (4th attainment) (5th attainment) (6th attainment).

- By studying in groups, students search technologies belonging to previous years and they write a report related to what a child who lived in those years could do with the technology s/he had. They also try to determine advantages and disadvantages of today’s technologies by brainstorming (1st attainment) (2nd attainment) (3rd attainment).

In the field of information technologies, students are asked to design a device that would meet a need in future. They are asked to design this device on paper, and then to present it as a picture or a model (2nd attainment) (6th attainment).

### A Single Discipline-based Learning Applied to the Control Group

The learning based on a single discipline provides acquisition of knowledge and skills in a single domain. The aspects of a field can be studied in detail. Its purpose is not to relate this discipline to other disciplines. Only knowledge and skills concerning that field are transferred.

Learnings which include only one discipline are crucial in developing scientific thinking and research skills as they provide concentration on only that field. In learnings based on a single discipline, in order to solve problems, the work of combining knowledge and skills which are obtained in different lessons are left to students and it is usually supposed that it would happen automatically. Teachers try to give information only on their own lessons and they do not lay emphasis on to what extent knowledge and skills learned in these lessons are used in other lessons or how they are related (Yıldırım, 1996).

The hypothesis of the research was determined as "Integrated learning increases academic achievement of grade 7 students in communication learning domain in comparison with learning based on a single discipline". It was determined that the studies conducted on integrated learning in the literature (Corlu, Capraro and Caproro, 2014; Fan and Ritz, 2014; Korkmaz and Konukaldı, 2015) were mostly done in numeric fields. There are no researches in which multiple domains such as Turkish, Technology and Design, Art (Visual Arts, Music), Social Studies are examined and integrated by considering their intersection points. Kanatlı and Çekici (2013) suggested the lessons which can be studied by integrating with Turkish lesson as Foreign Language, Social Studies, Music, Visual Arts, Drama, Information Technologies, and Media Literacy. Due to these reasons, the purpose of the research is to compare the effect of integrated learning and learning based on a single discipline on student achievement at the level of grade 7 in communication learning domain by integrating Turkish, Social Studies, Technology Design and Art lessons.

## Method

### Model of the Research

The purpose of this research is to compare the effect of the integrated learning and single discipline-based learning on academic achievement of students at the level of grade 7 in communication domain. This experimental research was done according to the pretest-posttest control group design which is one of the experimental designs.

Experimental designs are research designs in which the data that would to be observed is directly produced under the control of the researcher in order to determine the cause-effect relationship. In a research which use experimental design, objectives are usually expressed as hypotheses. In pretest-posttest control group

design, there are two groups which are formed randomly. One of them is called experimental group, the other one is called control group. In both groups, measurements are carried out before and after the test (experiment) (Karasar, 2008).

In the qualitative dimension of the research, document analysis was applied. Document analysis includes the analysis of written materials which involve information about the fact and facts that would be searched (Yıldırım and Şimşek, 2011). The answers given by the students to questions which were asked as pretest and posttest and the opinions of the teachers about the application at the end of the application were examined in detail.

In the research, the descriptive mixed method including both qualitative and quantitative approaches was employed. The mixed method is a research type in which data are collected, analyzed, findings are integrated and used to draw inferences by using qualitative and quantitative approaches (Tashakkori and Teddlie, 2003).

Symbolic view of the research model is given in Table 1 below:

Table 1

*Symbolic View of the Research Model*

| | | | |
|---|---|---|---|
| G1 | O1.1 | X1 | O1.2 |
| G2 | O2.1 | | O2.2 |

**G1:** The experimental group in which integrated learning was applied.

**G2:** The control group in which learning based on a single discipline was carried out

**X1:** Integrated Learning

**O1.1-O2.1:** Pretest (Achievement Test)

**O1.2-O2.2:** Posttest (Achievement Test)

The table given below shows the research process:

Table 2

*The Research Process*

- The Main Objective of the Research

To compare the effect of integrated learning and learning based on a single discipline on academic achievement of grade 7 students in communication learning domain.

- Application of pretests

(10 weeks)

- Providing education according to integrated learning in the experimental group, learning based on a single discipline in the control group
- Application of posttest

## Participants

The study population of the research consists of 7th grade students in a primary education school in the center of Konya in 2015-2016 academic year. The study population includes 38 students in total, 19 students in the experimental group and 19 students in the control group. The class 7-A represents the experimental group, the class 7-B stands for the control group. 11 students from the control group participating in the research are female (57.89%), 8 students are male (42.10%). In the experimental group, 10 students (52.63%) are female, 9 students are male (47.36%).

While showing quotes from students' answers, codes were used. Sample coding: (C, M, 2): Control group, male, 2nd student. (E, F, 6): Experimental group, female, 6th student.

## Comparison of the Experimental Group and the Control Group

In order to determine whether study groups are equal, an achievement test including open ended questions asked as pretest at the beginning of the application and as posttest at the end of the application was used. The results of the pretest were analyzed using t test, which is utilized whether the difference between two unrelated sampling means is meaningful. The pretest results of the groups are given in the table.

Table 3

*Communication Skills Assessment Form Pretest Scores of the Groups*

| Group | N | $\overline{X}$ | S | sd | t | p |
|---|---|---|---|---|---|---|
| Experimental Group | 19 | 60.42 | 6.46 | | | |
| Control Group | 19 | 59.84 | 7.43 | 36 | .40 | .56 |

When the result of the t test which was conducted to assess pretest scores of the study groups are examined, depending on the [$t_{(38)} = .40$, $p>.05$] results in total, it is seen that there is not a meaningful difference between the pretest scores that the experimental and the control groups got in "The Communication Skills Assessment Form". Therefore, it is possible to say that the experimental and the control groups are equal to each other.

## Data Collection Instrument

The students were assessed by using an achievement test including open ended questions. The prepared achievement test included the entire attainments of integrated TSTA curriculum. Sample questions are given below:

*"What is communication? What does this concept mean to you? Explain it by considering all of its dimensions (visual, written and verbal) and giving examples from your own life."*

*"Compare new media tools with traditional media tools."*

*"Critically evaluate the last news text you read, listened or watched."*

In order to test whether the achievement test is valid, first of all, the test was examined in terms of content validity. The content validity is the indicator whether test items qualitatively and quantitatively measure the defined behavior (trait) (Büyüköztürk, 2007). The opinions of the subject matter experts were asked for the content validity of the test. To assess the question pool sent to the experts, sections of "appropriate-inappropriate and your suggestions if it is not appropriate" were included next to each item. The opinions of 7 out of 9 subject matter experts to whom the question pool was sent were obtained. The questions approved by the experts were included and necessary changes were made in the questions which were suggested to be changed. For example : The question "Evaluate the last news text you read, listened or watched" was changed as "Critically evaluate the last news text you read, listened or watched".

In order to ensure reliability, the results of the achievement test which was used as the pretest and posttest were assessed by the researchers and the assessments were averaged.

**Data Collection**

Learning based on a single discipline was carried out in the control group, whereas integrated TSTA learning was applied in the experimental group. In the classroom environment which was arranged according to the integrated learning; lessons were taught with activities and lesson plans prepared cooperatively by teachers of Turkish, Social Studies, Technology Design and Art. Before starting lessons, in relation to communication topic, attainments pursuant to integrated learning were written, activity samples and lesson plans were prepared and integrated learning was introduced to the students.

Through this research, integrated learning and single discipline-based learning programs have been formed for communication domain. The lessons were taught in accordance with the prepared curriculum and daily lesson plans.

**Analysis of Data**

Each of the questions in the achievement test was scored. Standard deviation of the distributions were calculated using the means of pretest and posttest scores that the students got in the achievement test, and t test was conducted in order to see whether the difference was meaningful.

## Results

The hypothesis of the research was "Integrated learning increases academic achievement of grade 7 students in communication learning domain in comparison with learning based on a single discipline". To test this hypothesis, the means of the pretest and posttest scores that the experimental and control groups got in the achievement test were compared and the findings related to the comparisons are given in the table below.

Table 4

*The Findings Related to the Pretest and Posttest Scores of the Groups*

| **Groups** | **N** | **Pretest** | | **Posttest** | | **Difference of Means** | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | $\overline{X}$ | **S** | $\overline{X}$ | **S** | $\overline{X}$ | **S** | **t** | **p** |
| Experimental Group | 19 | 60.42 | 6.46 | 73.31 | 7.02 | 12.89 | 2.01 | | |
| Control Group | 19 | 59.84 | 7.43 | 64.31 | 6.86 | 4.47 | 2.98 | 7.38 | .02 |

According to the findings in Table 4, it is seen that the posttest scores of the experimental and the control groups are higher. This increase which is [t (38) = 7.38, p<.05] in total is at a meaningful level in favor of the experimental group. In order to see to what extent integrated TSTA learning applied to the experimental group was effective in comparison with the control group, it was tested whether there was a difference in terms of posttest application averages of the groups. The analysis results of posttest score means of the groups are given in Table 5.

Table 5

*Findings Related to the Posttest Scores of the Groups in the Achievement Test*

| **Group** | **N** | $\overline{X}$ | **S** | **t** | **p** |
|---|---|---|---|---|---|
| Experimental Group | 19 | 73.31 | 7.02 | | |
| Control Group | 19 | 64.31 | 6.86 | 4.38 | .02 |

As it is seen in Table 5, when posttest score averages of the groups are compared, there is a meaningful difference which is [t (38) = 4.38, p<.05] in total in favor of the experimental group. This result shows that integrated TSTA learning applied to the experimental group has an effect at a meaningful level in communication learning domain.

It was determined that the students in the control and experimental groups gave similar answers to the achievement test which was applied as the pretest.

Samples from the answers given by the students to the question; *"What is communication? What does this concept mean to you? Explain it by considering all of its dimensions (visual, written and verbal) and giving examples from your own life"* are given below:

The answers given by the students to the question which served as the pretest:

> *"Communication means talking to people. I think we cannot live without communication. Communication is established on television and the internet, in writing and speaking. I also try to communicate."(C, F,5 )*

> *"I consider communication as being able to speak. Speaking is the first step of visual, written and verbal communication. In order to communicate in my life, first of all, I speak" (E, M, 9)*

The answers given by the students to the question which served as the posttest:

> *"Talking to people, meeting people and writing to people are communicating. People who can speak, listen and write may communicate with each other. It is necessary to know the entire dimensions of communication in order to communicate. Communicating is also very important in my life." (C, F, 7)*

> *"Communication is a multidimensional concept. Visual communication is communication through visual materials. This shows that communication is not only face-to-face. Being able to communicate makes life easier.*

> *"As a matter of fact, written communication and visual communication- in other words, all dimensions of communication are for people's interactions. We the people see, speak and listen. We understand each other. Communication is actually being able to understand each other. When I communicate with my friends and other people, first of all, I try to understand them. I try to understand while speaking or writing. Sometimes I try to understand a person who produced a visual."(E, F, 2)*

Samples among the answers given by the students to the question; *"What do you think about the past and the present of communication technologies? Evaluate."* are given below:

The answers given by the students to the question which served as the pretest:

> *"Today, communication technologies are more common. There are more computers. There were fewer computers in the past."(C, M, 1)*

*"Communication technologies have developed a lot. Today, communication technologies have developed a lot because technology has developed a lot." (E, F, 8)*

The answers given by the students to the question which served as the posttest:

*"Technology has developed a lot. Therefore, there are more ways of communication. Today, there are various ways. Computers, mobile phones make our communication easier." (C, F, 5)*

*"As technology has developed a lot today, it is possible to communicate in various ways in comparison with the past. A piece of music we listen to on our computers, a picture or a photograph we see on our mobile phones or text messages we send to each other. All of them have occurred as a consequence of development in communication technologies. Whatsapp, instagram, facebook are some them."(E, M, 4)*

Samples of answers given by the students to the question *"Critically evaluate the last news text you read, listened or watch."* are given below.

The answers given by the students to the question which served as the pretest:

*"I watched the news last night. There were people who escaped from Syria. I was really sorry. I wish there were no wars." (C, M, 3)*

*"I saw a car accident in the latest news. There were two deaths. The driver was driving very fast and did not fasten his seatbelt. He should not have driven that fast and he should have fastened his seatbelt."(E, F, 4)*

The answers given by the students to the question which served as the posttest:

*"The latest news I watched on television was a burglary. Burglars broke into a market. Everybody must know stealing is bad. Now, the market owner is in trouble. I think everybody should help him" (C, M, 2)*

*"What I saw in the news was news about war. There is a war in Syria. The whole world is deeply saddened by this war but it is still going on. Now it must be ended. Instead of hearing news on the war, there must be news which is made to stop the war. We are almost watching live how the war is happening. We must also use these technologies to end wars." (E, M, 3)*

Samples of opinions which were given at the end of the experimental application by the teachers who taught lessons cooperatively are presented below:

*"The topic communication, especially in my lesson, that is, in Turkish lesson, is both very important and it is the most significant objective of my lesson. Up until today, I always taught my lessons on my own. For the first time, I taught lessons with my colleagues from other fields. Just as life, communication is also multifaceted and it has another facet in each field of life. I believe that this application was very helpful for the students in the experimental group. (Teacher of Turkish)*

*"Today technology is indispensable in every field of life. Moreover, one of the benefits of technology is to make communication easier. By integrating lessons, we had more effective lessons and we already made the technologies that the students would use more productive for them. I think we have also contributed to their creativity as well." (Teacher of Technology and Design)*

*"The Social Studies lesson is a lesson which is very appropriate for the integrated learning because it is a very comprehensive lesson. It includes the past, the present and the future. It was a great and useful experience to teach with my colleagues. I think we were more beneficial to the students in terms of communication by working together." (Teacher of Social Studies)*

*"One of the best ways of communicating is music. I think we have made our students understand this. Even only this will contribute to them. Of course, seeing their teachers while communicating to each other was also important." (Teacher of Music)*

*"I am very lucky to participate in the integrated learning application because teachers feel happiest when they know they are beneficial to their students. We tried to make them understand communication in every respect and I think we have achieved this. As a matter of fact, we uncovered the truth of life by integrating different lessons." "Teacher of Fine Arts"*

## Conclusion and Recommendations

It was determined that integrated TSTA learning applied to the experimental group was more effective than the single discipline-based learning applied to the control group in communication learning domain. In the research by Jacobs (1989), it was detected that interdisciplinary teaching made important contributions to the learning of students. According to Duman and Aybek (2003), topics became more meaningful by the help of integrated learning. It is possible to say that these results indicate the effectiveness of integrated learning on academic achievement.

When the answers given by the students to the achievement test were compared, it was observed that the students in the experimental group made more explanatory answers in comparison with the students in the control group. Mcdonald and

Czerniak (1994) remark that students learn how to establish deeper relationship among different disciplines and to structure different information easily through integrated learning. Yavuz (2015) states that different disciplines cannot benefit from each other sufficiently at schools and he emphasizes that it is likely to contribute to students in terms of getting a multiple, different and integrated perspective by the simultaneous presence of teachers of different disciplines in the learning environment according to the content which would be taught through integrated learning. It is possible to express that integration of different skills in different fields by integrated learning is effective on developing thinking skills of students

It was determined that the answers of the students in the experimental group included samples from different fields related to communication and these students could integrate these fields with each other. Kansızoğlu(2014) states that using different disciplines together contributes to the academic, personal and social development of a student and it would make contributions to students' critical, multi-directional, creative and integrative thinking, skills of problem solving and acquiring different perspective. Aybek (2001) supposes that integrated learning is very crucial in terms of encouraging students to be interested in lessons and ensuring teaching. Depending on these findings, it is likely to say that it is necessary to do integrated learning activities in different fields.

Students in the control group gave answers mostly at the level of knowledge, whereas students in the experimental group gave answers at the level of analysis and evaluation. Leatham, Lawrence and Mewborn (2005) stated that higher order thinking processes such as problem solving, evaluating, drawing conclusions and making connections could be measured using well-prepared open ended questions. Depending on this, it is possible to state that integrated learning is important to students in terms of gaining higher order thinking skills.

At the end of the application, the teachers expressed that integrated learning brought multi-directional situation of life into the classroom environment by integrating different disciplines and learning of the students was more effective. Yıldırım (1996) stated that teachers could discover how to study together in terms of effective and meaningful learning by recognizing aspects and needs of each other's field by the help of integrated learning. In their researches (Mason, 1996; Tchudi and Stephen, 1993), it was stated that teachers need to be in cooperation for an effective learning environment. From this point of view, it is likely to say that integrated learning makes positive contributions to the cooperation among teachers.

Yıldırım (1996) points out that students, especially at the level of secondary school, are not ready to go into the rigid patterns of disciplines, this situation causes problems such as finding learned knowledge meaningless, irrelevant to daily life, abstractness of knowledge and skills and difficulty in putting into practice. Integrated learning is more appropriate for the natural learning process and the way a student perceive the world.

Accordingly it is possible to say that integrated learning provides a way for students that they can use in order to reach their goals and solve their problems by integrating attainments of different fields for the solution of the problem emerging because of limits of a single field and not being able to transfer the acquired attainments to other fields.

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# Turkish Adaptation of Digital Literacy Scale and Investigating Pre-service Science Teachers' Digital Literacy*

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## Abstract

The shortest description of digital literacy is the one made by Eshet-Alkalai (2004) as; "survival skill in the digital era". According to Ng (2012) the indicator of an individual's being digital literate is her/his adaptation to the new or emerging technologies. Therefore, it is important for the 21st century humanity to develop digital literacy skills. Today, countries are aware of the fact that the quality of education has a big role in shaping their future so they review their education policies accordingly. In this regard, they pace for the sake of benefiting from technology in education. In Turkey, the main aim of the FATIH Project (Movement of Enhancing Opportunities and Improving Technology), carried out by Turkish Ministry of National Education since 2010, is to increase technological opportunities in schools and effectively integrate technology into educational environments. A plethora of research have emphasized that the project increases the technological opportunities however there are deficiencies in its usage in educational environments effectively. The most important stakeholders that influence the success of the project are teachers and the students. Determining the digital literacy skills of teachers, pre-service teachers and students is important in terms of developing the required teacher education programs. Therefore, one of the aims of this research was to adapt the digital literacy scale developed by Ng (2012) into Turkish and the other was to investigate pre-service science teachers' digital literacy. 979 junior and senior pre-service science teachers from 13 state universities participated in the research. Factor loadings of the scale items varied between 0.46 and 0.74 in according to the exploratory factor analysis result. In the scale; 10 items fall into one factor and explain 40% of the total variability. Cronbach Alpha reliability score is 0.86. The adapted version of the digital literacy scale is determined as valid and reliable. According to the findings related to the second aim of the study, the digital literacy skills of pre-service science teachers seem generally qualified.

***Keywords:*** scale adaptation, digital literacy, pre-service teachers

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# Dijital Okuryazarlık Ölçeğinin Türkçeye Uyarlanması ve Fen Bilgisi Öğretmen Adaylarının Dijital Okuryazarlık Durumları

## Öz

Dijital okuryazarlık için yapılmış en kısa tanım "dijital çağda hayatta kalma becerisi" şeklindedir (Eshet-Alkalai, 2004). Ng (2012)'ye göre bir bireyin dijital okuryazar olmasının göstergesi; yeni veya gelişmekte olan teknolojilere adaptasyonudur. Bu nedenlerle dijital çağda öğrenen ve öğreten bireylerde bu becerileri geliştirmek 21. yüzyılda oldukça önemlidir. Günümüzde ülkeler geleceğin şekillenmesinde kaliteli eğitimin büyük rol oynayacağının farkındadırlar ve buna göre eğitim politikalarını gözden geçirmektedirler. Bu nedenle eğitimde teknolojiden daha fazla yararlanma adına adımlar atılmaktadır. Türkiye'de Milli Eğitim Bakanlığı tarafından 2010 yılından itibaren yürütülen FATİH (Fırsatları Artırma ve Teknolojiyi İyileştirme Hareketi) projesinin temel amacı okullarda teknolojik fırsatları artırmak ve etkili olarak teknolojiyi eğitim ortamlarına entegre etmeyi sağlamaktır. Projenin teknolojik fırsatları artırdığı gerçeğinin yanı sıra eğitim ortamlarında etkili kullanımına ilişkin eksikliklerine vurgu yapan araştırmalar da yer almaktadır. Projenin başarısını etkileyen en önemli paydaşlar şüphesiz ki öğretmen, öğretmen adayları ve öğrencilerdir. Öğretmen, öğretmen adayları ve öğrencilerin dijital okuryazarlık durumlarının belirlenmesi, gerekli öğretmen eğitim programlarının şekillendirilmesi ve öğretmenlerin öğrencilerine teknolojik liderlik yapabilmeleri açısından önemlidir. Bu nedenle bu çalışmanın iki amacından ilki Ng (2012) tarafından geliştirilmiş olan dijital okuryazarlık ölçeğinin Türkçeye uyarlanması ve diğer amaç ise fen bilgisi öğretmen adaylarının dijital okuryazarlık yeterliklerinin araştırılması olmuştur. Araştırmaya 13 devlet üniversitesinden 3. ve 4. sınıfta okuyan 979 fen bilgisi öğretmen adayı katılmıştır. Açımlayıcı faktör analizi sonucunda ölçek maddelerinin faktör yükleri 0.46 ile 0.74 arasında değişkenlik göstermiştir. Ölçekte; tek faktörde 10 madde yer almakta ve toplam değişkenliğin %40'ını açıklamaktadır. Ölçeğin güvenirliğine ilişkin Cronbach Alpha değeri 0.86 olarak bulunmuştur. Yapılan dijital okuryazarlık ölçeği uyarlama çalışmasının geçerli ve güvenilir olduğu belirlenmiştir. Bununla birlikte araştırmanın bulguları fen bilgisi öğretmen adaylarının dijital okuryazarlık becerilerinin genel olarak iyi olduğunu göstermektedir.

***Anahtar Sözcükler:*** ölçek uyarlama, dijital okuryazarlık, öğretmen adayları

## Introduction

Digital literacy, which has become a prevalent issue in the education literature in the last decade (Knobel, 2011; Li & Ranieri, 2010; Ng, 2012; Thompson, 2013) have been listed among 21st century skills (Voogt, Erstad, Dede & Mishra, 2013; Vavik & Salomon, 2015). Consequently, it seems to be important for a country to have digitally literate teachers and students as well. Gilster (1997) was the first researcher who revealed the concept of digital literacy. There is a complication in usage of the "digital literacy" concept in the literature. Digital literacy was limited with technical aspects or cognitive and socio-emotional aspects in the literature (Eshet-Alkalai, 2004). According to Aviram and Eshet-Alkalai (2006) "Digital literacy is usually conceived of as a combination of technical-procedural, cognitive and emotional-social skills." The shortest definition of digital literacy was presented by Eshet-Alkalai (2004) as survival skill in the digital era. Eshet-Alkalai (2005) also presented a framework for digital literacy including photo-visual, reproduction, information, branching, and socio-emotional literacies.

Ng (2012) revealed a digital literacy framework considering all the existing definitions. According to this framework, digital literacy has three dimensions; technical (possessing the technical and operational skills to use ICT for learning and in everyday activities), cognitive (ability to think critically in the search, evaluate and create cycle of handling digital information) and socio-emotional (being able to use the internet responsibly for communicating, socializing and learning). According to Ng (2012), in order to determine whether an individual is a digitally literate, adaption of the individual to new or emerging technologies can be assumed as an indicator. That is to say, we expect in-service and pre-service teachers as well as students to adapt easily to new technologies. In addition, government policy makers should provide opportunities for these stakeholders both for improving citizens' digital literacy skills and integration of technology into education. In Turkey, Ministry of Education has been conducting FATIH (Movement of Enhancing Opportunities and Improving Technology) project since 2010 in order to increase technological opportunities for state schools and to integrate technology into educational settings effectively. Besides the increasing number of technological tools in schools, in-service training programs have been being utilized for this purpose. This project has a huge budget. However, there are many research findings, which criticize the effectiveness of the project (Ekici & Yılmaz, 2013; Banoğlu, Madenoğlu, Uysal & Dede, 2014; Keleş & Turan, 2015) in terms of efficacy especially when we consider second order barriers of technology integration. These barriers include knowledge, attitudes, and skills of teachers (Ertmer, 1999). In addition, PISA 2015 results showed that Turkish students were ranked as 52nd among 70 countries in terms of science literacy (OECD, 2016). Considering the above mentioned points, it can be said that policy makers should take some precautions in order to cope with this problem. One of the points to be focused on seems to be digital literacy skills of teachers and students. Because, technology can be utilized effectively for better education with digitally literate teachers and students who can easily adapt to and use technology in teaching-learning processes. Knobel (2011) pointed out the need for an

innovation in teacher education programs so that teachers of the future will have digital literacy skills and will help their students as technology leaders. 21st century teachers should be digitally literate in order to be beneficial for their students (Withrow, 2004). In this context, assessing digital literacy arise as one of the issues to be performed.

A digital literacy scale, having 47 items, validated with a sample of teenagers by Rodríguez-de-Dios, Igartua & González-Vázquez (2016). It was designed as a 5-point Likert type self-report questionnaire. Hargittai (2005) studied on web-oriented digital literacy. Hargittai (2005) utilized both observations and survey questions together to investigate participants' digital literacy. This study suggested observing performance instead of assessing self-perceived digital literacy skills. Items used in this study were related to the familiarity of some technology related features such as MP3, PDF, advance search etc. Participants were asked how familiar they were with each of these features in each item. Gui and Argentin (2011) summarized main challenges of a large-scale survey tending to assess digital literacy skills. They conducted a test including three dimensions of digital literacy on 980 high school students. Items of the test consisted of knowledge questions, situation-based questions and online tasks for students to be completed. They used a Rasch-type model for scoring. The digital literacy scale developed by Kıyıcı (2008) can be given as an example for a digital literacy scale towards Turkish students. The scale has 100 items and is used by many other researchers. There are 6 sub-dimensions of this scale.

Considering the above-mentioned examples, it can be said that assessing digital literacy is not an easy task and that there is not a definite way for this purpose mentioned in the literature. For this reason, this study considered the feasibility of implementation regarding this assessment. Fraenkel and Wallen (1996) point out feasibility of implementation as one of the key features including validity, reliability and some other factors to be considered for an ideal assessment instrument. Number of items and practicality of implementation are directly related to feasibility. Many of the current digital literacy assessment tools need a long time and effort to be implemented. For this reason, there is a need for a valid, reliable and feasible digital literacy assessment scale for Turkish teachers or pre-service teachers. In this study, participants were intently selected from pre-service science teachers from 13 state universities in Turkey because of the above-mentioned PISA results and the importance of science teaching on students' science literacy. In this context, this study aimed to adapt the digital literacy skills scale (originally developed by Ng [2012]) into Turkish and investigate the qualifications of Turkish pre-service science teachers in terms of their digital literacy skills. The reasons for selecting this scale can be summarized as follows; it is difficult to find a digital literacy scale in Turkish, the scale is easy to be implemented (feasible), number of items are not crowded and the scale is well accepted in the related literature.

In conclusion, the purposes of this study is twofold:

1) to adapt the digital literacy skills scale developed by Ng (2012) and
2) to investigate the qualifications of Turkish pre-service science teachers in terms of their digital literacy skills.

## Method

### The Procedure

Adaptation of digital literacy skills scale (originally developed by Ng [2012]) was realized within four steps. Firstly, two of the researchers translated the original ten items into Turkish independently. Then, translated versions were compared in terms of covering the original meanings. Secondly, a third researcher conducted a back translation on that translated version. Also, a Turkish language specialist examined the meaning of items in this step. Three researchers as well as the Turkish language specialist decided to implement this finalized version. At the third step, the scale was presented to Ahi Evran University Ethical Committee for approval of implementation. Following the approval, a demographic part was added to the scale to collect data about participants' age, gender and years (see Appendix). Then, all the items were presented to the research sample by a 5-point Likert mode (from 1=strongly disagree to 5=strongly agree). At the last step, data was entered into the SPSS and an exploratory factor analysis (EFA) was conducted for validation of the scale results.

### The Participants

979 pre-service science teachers from 13 state universities participated. They were particularly selected among junior (530 participants) and senior (431) pre-service science teachers, because the technology enhancement courses were already taken at those levels. 18 participants did not mark their grade level. Convenience sampling was applied to reach the maximum number of sampling. Of the all participants, 764 were female. Their ages were observed between 18 and 37 with a mean of 21.7.

### Data Analysis

An exploratory factor analysis (n=979) was performed on the data to collect construct-related evidence for validity of the scores (Fraenkel & Wallen, 1996). Kaiser-Meyer-Olkin (KMO) measure of sampling and the Bartlett's test of sphericity were firstly examined to determine the appropriateness of sample for EFA (Costello & Osborne, 2005). Then, a maximum likelihood analysis together with a varimax rotation was executed. Taking the decisions regarding the retention of items several methods (eigenvalue > 1, communality value > 0.5, scree plots and maximizing the explained variance) were utilized. Finally, following the EFA, Cronbach's alpha scores were examined for reliability purposes.

## Findings

As mentioned previously, we firstly examined KMO and Bartlett's test of sphericity values for appropriateness of sampling. KMO measure of sampling index was calculated as 0.90 by SPSS. Also, Bartlett's test of sphericity was significant at $p < 0.0001$ level together with a chi-square value of 3383 (n=979). The maximum likelihood analysis together with varimax rotation produced the factor loadings presented in Table 1.

Table 1

*Factor Loadings Calculated with Maximum Likelihood Analysis*

| Item Number | Item | Factor Loading |
|---|---|---|
| 1 | I know how to solve my own technical problems. | 0.71 |
| 2 | I can learn new technologies easily. | 0.74 |
| 3 | I keep up with important new technologies. | 0.71 |
| 4 | I know about a lot of different technologies. | 0.70 |
| 5 | I have the technical skills I need to use ICT for learning and to create artefacts (e.g. presentations, digital stories, wikis, blogs) that demonstrate my understanding of what I have learnt. | 0.68 |
| 6 | I have good ICT skills. | 0.49 |
| 7 | I am confident with my search and evaluate skills in regards to obtaining information from the Web. | 0.63 |
| 8 | I am familiar with issues related to web-based activities e.g. cyber safety, search issues, plagiarism. | 0.52 |
| 9 | ICT enables me to collaborate better with my peers on project work and other learning activities. | 0.60 |
| 10 | I frequently obtain help with my university work from my friends over the Internet e.g. through Skype, Facebook, Blogs. | 0.46 |

The analysis produced a one-factor solution called as digital literacy skills. As can be seen in Table 1 all the factor loadings were observed at values between 0.46 and 0.74. Since all the items had factor loadings higher than 0.40, all the items were retained (Stevens, 1996). This one factor solution explained 40 % of the variance. Finally, Cronbach's alpha was found as 0.86 corresponding to high reliability.

### Descriptive Statistics

Following validation of the scale results, we examined the descriptive scores including each item's mean (M), standard deviation (SD), minimum and maximum score. Descriptive statistics were investigated for responding to second purpose of the study. Item statistics were presented within Table 2.

Table 2.

*Descriptive Statistics*

| Item Number | M | SD | Minimum | Maximum |
|---|---|---|---|---|
| 1 | 3.70 | 0.89 | 1 | 5 |
| 2 | 3.98 | 0.86 | 1 | 5 |
| 3 | 3.74 | 0.93 | 1 | 5 |
| 4 | 3.44 | 0.98 | 1 | 5 |
| 5 | 3.72 | 1.00 | 1 | 5 |
| 6 | 3.17 | 1.05 | 1 | 5 |
| 7 | 3.83 | 0.93 | 1 | 5 |
| 8 | 3.30 | 1.08 | 1 | 5 |
| 9 | 3.87 | 0.88 | 1 | 5 |
| 10 | 3.79 | 1.08 | 1 | 5 |

As can be seen in Table 2, all the items' mean scores were observed above mid-point which was 3 (because the minimum score was 1 whereas the maximum was 5 for each item). Considering this result, it can be mentioned that Turkish pre-service science teachers' digital literacy skills seemed qualified. Maximum mean scores were observed for items 2 and 9 whereas minimum mean scores were observed for items 6 and 8. Accordingly, participants' digital literacy skills related to learning new technologies and collaborating with others via ICT is more qualified than their skills related to ICT and issues of web-based activities. When it comes to standard deviations, minimum scores were observed for items 1, 2 and 9 whereas the highest scores for standard deviations were observed for items 8 and 10. This means that participants' scores on items 1, 2 and 9 are closer than their scores on items 8 and 10. In other words, participants' digital literacy scores related to solving technical problems, learning new technologies and collaborating by ICT is closer than their scores related to issues of web-based activities and utilization of internet connection for their own university work.

## Conclusion and Discussion

In conclusion, the adapted version of the digital literacy scale can be used as a valid and reliable scale for Turkish pre-service science teachers. This is mainly important because this scale seems to fill in the gab regarding the need for a valid, reliable and feasible instrument to be used for assessing digital literacy, to some extent. The existing digital literacy assessment tools generally requires a long time and effort to be implemented. Fraenkel and Wallen (1996) point out feasibility of implementation as one of the key features including validity, reliability and some other factors to be considered for an ideal assessment instrument. In this regard, feasibility of this validated scale seems to come into prominence. Analysis in this study were conducted on data gathered from Turkish pre-service science teachers. For this reason, future research can adapt the scale for (pre-service) teachers from other disciplines. By this way it will be possible for researchers, studying on (pre-

service) teachers' digital literacies, to find and conduct Turkish version of the scale easily.

This study also investigated the qualifications of Turkish pre-service science teachers in terms of their digital literacy skills. According to the results, pre-service science teachers' digital literacy skills were found to be generally qualified. In Turkey there are many research focusing on attitudes, self-efficacies, competencies of (pre-service) science teachers in ICT context (Çelik & Karamustafaoğlu, 2016; Çetin & Güngör, 2014; Şad & Nalçacı, 2015; Kara, Aydın, Bahar & Yılmaz, 2014). However, it is difficult to find research focusing on digital literacy of Turkish (pre-service) science teachers. For this reason, discussion related to comparison of the findings of this study with previous ones in this manner could not be provided. Digital literacy assessment methods and tools seem to remain on the agenda of researchers in the upcoming years.

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**Appendix1.** The Turkish adapted version of the digital literacy scale

| **Bölümde kaçıncı yılınız?:** □ 3. □ 4. □ 4'ten fazla **Cinsiyetiniz:** □ Erkek □ Kız **Yaşınız:** ..... | | | | | |
|---|---|---|---|---|---|
| **DİJİTAL OKURYAZARLIK ÖLÇEĞİ** | **Kesinlikle katılmıyorum** | **Katılmıyorum** | **Kararsızım** | **Katılıyorum** | **Kesinlikle katılıyorum** |
| 1. Kullandığım teknolojilerle ilgili karşılaştığım teknik problemleri nasıl çözeceğimi bilirim. | | | | | |
| 2. Yeni teknolojileri kolayca öğrenebilirim. | | | | | |
| 3. Önemli yeni teknolojileri takip ederim. | | | | | |
| 4. Birçok farklı teknoloji hakkında bilgi sahibiyim. | | | | | |
| 5. Bilgi ve iletişim teknolojilerini öğrenme amaçlı kullanma konusunda ve öğrendiklerimi sergileyebileceğim dijital öğretim materyallerini (Örneğin: Sunumlar, dijital hikayeler, wikiler, bloglar) geliştirmek için gereken teknik becerilere sahibim. | | | | | |
| 6. Bilgi ve iletişim teknolojileri konusunda sahip olduğum beceriler yeterlidir. | | | | | |
| 7. İnternetten bilgi edinmek için yaptığım arama ve değerlendirmelerde kendime güvenirim. | | | | | |
| 8. Siber güvenlik, webde arama ve internette sahtecilik vb. internet etkinlikleri ile ilgili konulara aşinayım. | | | | | |
| 9. Bilgi ve iletişim teknolojileri, bir projede çalışma ve diğer öğrenme etkinlikleri konusunda akranlarımla daha iyi işbirliği yapmamı sağlar. | | | | | |
| 10. Üniversitedeki çalışmalarımda, arkadaşlarımla internet üzerinden (ör. Skype, Facebook, Bloglar aracılığıyla) sıklıkla yardımlaşırım. | | | | | |

**Appendix 2.** The original version of the digital literacy scale (Ng, 2012)

| **DIGITAL LITERACY SCALE** | **Strongly disagree** | **Disagree** | **Neutral** | **Agree** | **Strongly agree** |
|---|---|---|---|---|---|
| 1. I know how to solve my own technical problems. | | | | | |
| 2. I can learn new technologies easily. | | | | | |
| 3. I keep up with important new technologies. | | | | | |
| 4. I know about a lot of different Technologies. | | | | | |
| 5. I have the technical skills I need to use ICT for learning and to create artefacts (e.g. presentations, digital stories, wikis, blogs) that demonstrate my understanding of what I have learnt. | | | | | |
| 6. I have good ICT skills. | | | | | |
| 7. I am confident with my search and evaluate skills in regards to obtaining information from the Web. | | | | | |
| 8. I am familiar with issues related to web-based activities e.g. cyber safety, search issues, plaigarism. | | | | | |
| 9. ICT enables me to collaborate better with my peers on project work and other learning activities. | | | | | |
| 10. I frequently obtain help with my university work from my friends over the Internet e.g. through Skype, Facebook, Blogs. | | | | | |

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# Is ICT Integration A Magic Wand for Education? A Comparative Historical Analysis between Singapore and Turkey

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## Abstract

Information and Communication Technologies (ICT) integration has become increasingly important in educational systems of developing countries. However, there is a misconception about children's direct access to technological devices has a positive effect on their productivity and the quality of their learning. Several ICT integration projects have being implemented since 1984 by Ministry of Education in Turkey. In this context, there is a need to determine the necessity of ICT integration in education, mistakes and solutions while planning and implementing the ICT integration. This study presented the international assessment results of Singapore and Turkey in case of education and compared the histories of ICT integration in education process of these two countries. Comparative historical analysis method was used to compare the ICT integration history of two countries. Singapore holds the 1st rank in Network Readiness Index while Turkey holds the 48th rank in Global IT Report 2015. Various indexes were also examined such as quality of education, science and maths education and internet access in schools. Hence, some similarities and differences arose at the end of the comparison. Singapore and Turkey started to implement ICT integration studies in similar time periods. Findings indicated that ICT integration is essential, but it can be effective and beneficial when it will be implemented appropriate for the needs of the age as a supportive material for instruction and learning process. Moreover, it is important to focus on using it in all subject areas of the learning and instruction process instead of focusing on the ability of using the technological devices while planning the ICT integration process. Several recommendations according to the findings and comparisons were discussed in conclusion.

***Keywords:*** ICT in education, information and communicating technologies, ICT integration, Turkey, Singapore

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# BT Entegrasyonu Eğitim için Sihirli Bir Değnek mi? Singapur ve Türkiye Karşılaştırmalı Tarihsel Analizi

## Öz

Gelişmekte olan ülkelerin eğitim sistemlerinde Bilişim Teknolojileri (BT) entegrasyonu gittikçe önemli bir hale gelmektedir. Bununla birlikte, çocukların teknolojik cihazlara doğrudan erişimlerinin onların üretim becerileri ve öğrenmeleri üzerinde olumlu bir etkisi olduğuna yönelik bir kavram yanılgısı bulunmaktadır. Türkiye'de 1984'ten buyana çeşitli BT entegrasyonu projeleri yürütülmektedir. Bu bağlamda eğitimde BT entegrasyonunun gerekliliği ve BT entegrasyonu planlaması ve uygulamasında dikkat edilmesi gereken durumlar, hatalar ve çözümleri üzerine çalışma yapılması gerekmektedir. Bu çalışmanın amacı, Singapur ve Türkiye'nin eğitim alanında uluslararası değerlendirme sonuçlarını sunmak ve iki ülkenin eğitimde BT entegrasyonu geçmişini karşılaştırarak incelemektir. Iki ülkenin BT entegrasyonu geçmişlerini karşılaştırabilmek için karşılaştırmalı tarihsel analiz yöntemi kullanılmıştır. Singapur, Küresel BT Raporu 2015'e göre BT endeksinde ilk sırada yer alırken Türkiye 48. sırada yer almaktadır. Eğitim kalitesi, fen ve matematik eğitimi, okullarda internet erişimi gibi diğer indeksler de incelenmiştir. Singapur ve Türkiye, teknolojik gelişmelere paralel olarak BT entegrasyonu çalışmalarına benzer tarihlerde başlamışlardır. Karşılaştırmalar sonucunda ülkeler arasında çeşitli benzerlikler ve farklılıklar görülmüştür. Bulgular, BT entegrasyonun gerekli olduğunu fakat öğrenme ve öğretme sürecini destekleyecek şekilde çağın gereksinimlerine uygun olarak uygulanması halinde etkili ve yararlı olabileceğini göstermiştir. Ayrıca, BT entegrasyon süreci planlanırken sadece teknolojik cihazların kullanım becerisine odaklanılması yerine BT'in öğrenme ve öğretme sürecinde tüm konu alanlarında kullanımı üzerine odaklanılmasının önemli olduğu görülmüştür. Sonuç kısmında karşılaştırmalar ve bulgular ışığında çeşitli öneriler sunulmuştur.

***Anahtar Sözcükler:*** bilgi ve iletişim teknolojileri, BT entegrasyonu, eğitimde BT, Türkiye, Singapur

## Introduction

Although there is a perception in developing countries that children's direct access to new technologies increases their learning and ICT integration in education is improving in these countries rapidly, it is specified in the Global Information Technology Report published in 2015 that this is not a true belief. There are explanations about why ICT integration in education fails and it also mentions about the importance of focusing on educators instead of children's access to technology (Behar & Mishra, 2015). About 9 years ago, SITES Modules, which were the international comparative studies to help countries (including Singapore) to estimate their current positions in terms of ICT use in education, emphasized the same factors in its report. Increasing the level of computer access did not bring about more learning experiences for students and the impact of ICT use on students appeared to be highly dependent on the pedagogical orientation that teachers adopt in regard to that use (Law, 2008).

United Kingdom aims to cover the 90% of population with superfast internet connection and lowered the computing course age to 5. However, diffusion of ICT, internet connection and student access to internet have no significant effect on education and student productivity (Faber, Sanchis-Guarner & Weinhardt, 2015). Likewise, students' access to ICT has no direct effect on quality of education and course completion rate is 7% in the year of 2013 (Parr, 2013). Giving every child a laptop both enforces the country budget unnecessarily and it has no significant contribution to education (James, 2011; James, 2014; Cristia, 2013). In Singapore, subject area was highly recommended to be considered as an important factor rather than ICT infrastructure while integrating ICT to schools (Tay, Lim & Lim, 2015). In Turkey, big scale projects before FATIH, a project that aims to improve ICT use in schools since 2011, have no significant effect on the quality of education (Özdemir & Kılıç, 2007; Özdemir, 2010). Consequently, all these facts indicate that this situation creates some questions in mind about ICT integration in education: "What is wrong with ICT in education?", "Is ICT integration a necessity for education?" and "How should it be planned and implemented?"

Considering these questions, ICT integration in education has a number of sub-dimensions and it can vary according to region, educational system and grade level. Thus, it is necessary to conduct comprehensive studies to examine and evaluate the ICT integration in education. This can be done through a comparative methodology by examining countries' ICT integration process in education. Therefore, in this study, to gain detailed information about ICT integration process in education, the positive and negative aspects of ICT integration within the scope of formal education have been investigated by comparing Turkey with a country that is successful in international indexes about the quality of education and ICT integration.

## ICT Integration in Singapore and Turkey

Several ICT integration projects have been implemented since 1984 by Ministry of Education in Turkey (Goktas, Gedik & Baydas, 2013). At the same time, Turkey

has been participating in TIMSS assessments since 1999 and PISA assessments since 2003 as a developing country. Also Turkey's network readiness index was located in the Global Information Report, a detailed research about information technology across the world published by World Economic Forum. Students in Turkey are below the overall average in basic subjects such as science and mathematics, in 21st century competencies such as creative problem solving and in information technology literacy and also quality of education is below the world average according to the World Economic Forum's report, assessment results such as PISA and TIMSS and ICT integration in Turkey.

Examining the PISA, TIMSS assessment results and global reports, Singapore ranks 1st place in most topics and it ranks in Top 5 all the time in all topics. Moreover, Singapore started to ICT integration implementations at the same time with Turkey and these countries have some similarities in terms of ICT integration process. Because of this reason, it is intended to conduct a study between Turkey and Singapore in terms of ICT in education and to find responses to the questions at the end of the first paragraph. Therefore, the aim of this study is to present the ICT integration of Turkey and Singapore from past to present by analyzing and comparing their history of ICT integration in education and to determine the similarities and differences between them.

According to this aim, subtitles for this study are given below:

- International evaluation results of Singapore and Turkey (PISA, TIMSS, WEF)
- The brief history of ICT integration in education in Turkey within the scope of formal education
- The brief history of ICT integration in education in Singapore within the scope of formal education
- Similarities and differences between Singapore and Turkey in terms of ICT in education.

## Method

The current study employs comparative historical analysis method because it examines Singapore and Turkey's history of ICT integration process in education. Comparative historical research is a method that emphasizes the process over time and uses systematic and conceptualized comparison (Mahoney & Rueschemeyer, 2003). This method includes examining the societies' or other social units' situations over time according to some facts and comparing them with each other. It is a comparative analysis because it provides discovering the common patterns occurring in different time and places and it is a qualitative method to discover the patterns in historical processes of different cultures (Babbie, 2013; 2015).

The data resources of the comparative historical analysis are historical records (Babbie, 2013). Therefore, PISA and TIMSS results reports, World Economic Forum

Global Information Technology 2015 Report and Global Competitiveness 2015 Report were examined in order to present the international evaluations about two countries for the first subtitle. Official records and reports about national education of these two countries were examined for the second and third subtitle about the ICT integration history in education. In this context, documents, reports and meeting records of Ministries of National Education of Singapore and Turkey between 1984 and 2015 were accessed. PISA and TIMSS results from the time that Singapore and Turkey participated in assessments were accessed from their own official websites. Global Information Technology Report and Global Competitiveness Report were gained from World Economic Forum's official website. Thus, this study is a detailed analysis and comparison between the histories of ICT integration in education of these countries considering their situation according to the developing countries and entire world.

## Findings

### International Evaluation Results of Singapore and Turkey

There are four reports included in this study; PISA results, TIMSS results, Global Competitiveness Report and Global Information Technology Report. The Programme for International Student Assessment (PISA) is a triennial international survey, conducted by OECD (The Organization for Economic Co-operation and Development, 2015), which aims to evaluate education systems worldwide by testing the skills and knowledge of 15-year-old students. PISA is described as a unique evaluation because it develops tests which are not directly linked to the school curriculum. The tests are designed to discover what extent students can apply their knowledge to real-life situations and be equipped for full participation in society at the end of the compulsory education (OECD, 2015). Turkey attended PISA in 2003 and Singapore attended PISA in 2009.

Table 1. *PISA 2009 and 2012 Rankings of Singapore and Turkey (in 65 countries*)*

| | | **Reading** | **Math** | **Science** | **Creative Problem solving** |
|---|---|---|---|---|---|
| **PISA 2012** | Singapore | 3 | 2 | 3 | 1 |
| | Turkey | 42 | 44 | 43 | 34 |
| **PISA 2009** | Singapore | 5 | 2 | 4 | - |
| | Turkey | 39 | 41 | 42 | - |

*Creative problem solving assessment includes 44 countries

In PISA 2009, Singapore ranked 5$^{th}$ in reading, 2$^{nd}$ in mathematics and 4$^{th}$ in science, Turkey ranked 39$^{th}$ in reading, 41$^{st}$ in mathematics and 42$^{nd}$ in science. In PISA 2012, Singapore ranked 3$^{rd}$ in reading, 2$^{nd}$ in mathematics and 3$^{rd}$ in science, Turkey ranked 42$^{nd}$ in reading, 44$^{th}$ in mathematics and 43$^{rd}$ in science (Table 1). Singapore got higher scores in reading and science domains and kept its rank in mathematics domain. However, Turkey got lower scores in all three domains from the previous PISA to the last one. In PISA 2012 report, Singapore ranked 1$^{st}$ in

creative problem solving domain, while Turkey ranked 34th. According to all these rankings, Turkey exhibited lower performance than Singapore.

The Trends in International Mathematics and Science Study (TIMSS) is an international assessment and research project similar as PISA. TIMSS measures trends in mathematics and science achievement at the fourth and eighth-grade levels and also collects information about school and teacher activities (TIMSS, 2015).

Table 2. *TIMSS Rankings of Singapore and Turkey**

| | | **Mathematics** | | **Science** | |
|---|---|---|---|---|---|
| | | 4th grade | 8th grade | 4th grade | 8th grade |
| **TIMSS 2011** | Singapore | 1 | 2 | 2 | 1 |
| | Turkey | 35 | 24 | 36 | 21 |
| **TIMSS 2007** | Singapore | 2 | 3 | 1 | 1 |
| | Turkey | - | 30 | - | 31 |
| **TIMSS 2003** | Singapore | 1 | 1 | 1 | 1 |
| | Turkey | - | - | - | - |
| **TIMSS 1999** | Singapore | - | 1 | - | 2 |
| | Turkey | - | - | - | 33 |

*Attending countries: 2011; 4th grade 52, 8th grade 45 countries. 2007; 4th grade 36, 8th grade 48 countries. 2003; 4th grade 25, 8th grade 45 countries. 1999; 8th grade 38 countries.

In TIMSS 1999, Singapore ranked 1st in mathematics and 2nd in science in 8th grade level and Turkey ranked 33rd only in science 8th grade level. In TIMSS 2003, Singapore ranked 1st in both of 4th and 8th grade levels, Turkey did not participated in that assessment. In TIMSS 2007, Singapore ranked 2nd in mathematics and 3rd in science in 4th grade level and also ranked 1st in both domains in 8th grade level, Turkey participated in 8th grade level assessment only and ranked 30th in mathematics and 31st in science domain. In TIMSS 2011, Singapore ranked 1st in mathematics in 4th grade level, 2nd in mathematics in 8th grade level, 2nd in science in 4th grade level and 1st in science in 8th grade level, but Turkey ranked 35th in mathematics in 4th grade level, 24th in mathematics in 8th grade level, 36th in science in 4th grade level and 21st in science in 8th grade level (Table 2). The TIMSS results have pointed out that Turkey exhibited a lower performance than Singapore as in the PISA results.

The Global Competitiveness Report 2015-2016 assesses the competitiveness landscape of 140 economies by World Economic Forum. This report is not directly related with the quality of education but it has sub dimensions about the quality of higher education and training. It also provides insight into the drivers of the countries' productivity and prosperity. The Global Competitiveness Report remains the most comprehensive assessment of national competitiveness worldwide. According to this competitiveness index, Singapore ranks 2nd for the fifth year in a row. Turkey ranks 51st in 2015-2016 and in 2014-2015 it was 45. This shows that Singapore has a steady situation, however Turkey loses its competitiveness in time. (Global Competitiveness Report, 2015).

World Economic Forum has a special project within the framework of the Global Competitiveness and Risk Team and the Industry Partnership Programme for Information and Communication Technologies called as "The Global Information Technology Report 2015". This report collects data from countries according to different indicators and determines an index about a country's network readiness. According to the Global IT Report 2015, Turkey holds the 48th rank while Singapore holds the 1st rank in 143 countries in network readiness index. Network readiness index includes 4 basic sub-indexes; environment, readiness, usage, impact and there are 53 indicators under these sub-indexes. Not all of the indicators are related with this study's scope, so the indicators related with research aim were chosen and the situations of two countries (Singapore, Turkey) are examined according to these indicators. Rankings of the Singapore and Turkey among 143 countries are given below according to the Global IT Report's some indicators (Global IT Report, 2015).

Table 3. *Network Readiness Index Rankings of Singapore and Turkey*

| **Global IT Report 2015** | | **Readiness-Skills** | **Readiness-Skills** | **Impact-Social Impacts** |
|---|---|---|---|---|
| | | Quality of educational system | Quality of math & science education | Internet access in schools |
| | Singapore | 3 | 2 | 3 |
| | Turkey | 42 | 44 | 43 |

Singapore ranked 3rd in the quality of educational system, 2nd in the quality of math & science education and 3rd in the internet access in schools sub-indexes. However, Turkey ranked 42nd, 44th and 43rd in same sub-indexes (Table 3). Similar to the previous evaluations, Turkey indicated lower performance than Singapore and also Turkey is below the average of participating countries.

Considering all these international assessments, evaluations and reports, Turkey's scores were always below the average and decreased in the rankings. However, Singapore exhibited high performance in rankings, maintained its top position and seemed to be progressing. Despite occasional decreases, Singapore always ranked in top 5 in indexes.

## The Brief History of ICT Integration in Education in Turkey

Turkey has started to implement ICT integration since 1980s. In 1984, Computer Education Expertise in Secondary Education Commission was founded (Keser, 2011). 1100 computers were distributed at least one high school in each city in 1995 (Engin, Tösten & Kaya, 2010). Since the academic year 1985-1986, "Computer" course took part as an elective course in secondary education program. Computer labs were constituted in 100 secondary schools selected as pilot schools (Keser, 2011). Two teachers from each school were given in-service training course for 5 weeks (Uşun, 2004).

In 1989, The Ministry of National Education (MONE) made an agreement with 9 companies and the companies executed computer assisted instruction (CAI) implementations in 58 schools. During these applications, 6 billion Turkish Liras were spent, 378 computers were purchased for 18 schools, 2000 hours software of 37 courses were developed, training of 750 teachers was completed. There were some shortcomings determined in these CAI studies by executive committee charged by MONE; educational software were not be prepared appropriate for the curriculum, there were no effective teacher participation to the CAI implementations, there were no enough training for teachers and because of these reasons, CAI took no interest of students and were not be used effectively. Also introduction and advertise done by companies were weak (Uşun, 2004). Thus, this computer assisted instruction implementation were not considered as successful.

In 1990, MONE constituted National Education Development Project for 7 years that supported by World Bank. World Bank supplied 90.2 billion USA dollars to Turkey for the project. In 1991, 5121 computers were purchased. Until this year 11-12% of secondary schools in Turkey had computer labs and most of them were provided by MONE. 70% of the usage time of the computer lab were separated to the computer education, and 30% of it were separated to the computer-assisted instruction. At the end of 1995, 53 curriculum laboratory schools were constituted in order to provide hardware and educational software to other schools. Approximately 250 teachers received training for computer and educational software until 1997 (Uşun, 2004).

In the academic year 1997- 1998, as part of Improving Education Project 2000 that costed 6 billion dollars, MONE determined that computer labs would be constituted to at least two primary schools in each city and country. In the project it was planned that 70000 schools connected computer network.

In 1998, an agreement was signed between Republic of Turkey and World Bank. As part of this agreement, hardware and software were purchased to the schools, the schools connected to the internet and the teachers were trained about ICT with the support of World Bank (Akkoyunlu & İmer, 1998).

In 2002, MONE signed an agreement with the World Bank for 3 years for ICT integration again (MEB, 2007). Since the 2007-2008 academic year, it was decided that in elementary schools, "Information Technology" course took part as an elective course in the curriculum (Keser, 2011). In 2011, MONE began to implement FATIH project with support of Ministry of Transport and Communication. FATIH project aims the equality in learning and instruction and to enhance the technology in schools, to provide effective usage of information technologies in learning and instruction activities. Accessibility, productivity, effectiveness, measurability and quality are the key factors for success in this project. Also it is aimed to evaluate students not only with their academic achievement but also with their interests, activities and tendencies and to analyze students' all data of their education lives by this way. Thus, students will be better educated and they will be directed to the life

of business according to their own interest and achievements. It is determined in the project mission that students will be active learners with gaining 21st century skills such as technology use, effective communication, analytic thinking, problem solving, collaboration and cooperation. In addition to this, it is planned to provide tablet PCs to all students and to provide interactive whiteboards and laptop computers to all classrooms and to establish internet infrastructure to all schools. This project will provide teacher-student and interactive whiteboard-tablet PC interaction, effective use of information and instruction process with using classroom management. Teacher will share the materials with students, assign homework to students and measure students' learning levels in a more controlled manner. 447.288 interactive whiteboards, 1.437.800 tablet PCs, 41.996 multi functioned printers were distributed and infrastructure and internet access services were provided to 9.052 schools. Totally 424.250 teachers were trained with in-service training about the use of ICT and FATIH project (Ateş, 2013; MEB, 2007). In addition to these implementations, there is an online platform for the content part of the project. EBA (Education and Informatics Network) was designed by Innovation and Educational Technology Head Office as a social platform and it presents safe and true e-contents appropriate for different grade levels to teachers and students (EBA, 2015).

**The Brief History of ICT Integration in Education in Singapore**

Singapore has started to implement national ICT plans since 1980s (Seng & Choo, 2008). In the 1980s, Singapore Ministry of Education (MOE) initiated projects such as Computer Science as a Level Subject, Computer Appreciation Clubs and School Link Project to bring ICT in schools with the Government's National Computerization Plan. In the 1990s, the Professional Computer Support Program was started. This project aimed that all teachers became proficient in computer software to use them in their educational aims.

In 1994, computer applications project (CPA), a skill-based subject, was integrated to secondary schools. In 1996, the elements of office administration (EOA) subject was launched in secondary schools in order to improve secondary students' academic and technical skills. In these periods, some pilot studies were conducted in primary and secondary schools. Accelerating the use of ICT in primary schools program was implemented in six pilot schools and students spent about 10 percent of the curriculum time using educational packages for learning. The program was found to be efficient to most students. Student's and teacher's workbench project was implemented in six secondary schools and it provided digital educational resources for teachers. This pilot study was also found helpful for teachers and students. JCNet was also initiated in 1997 because of the interest in the use of internet in education. JCNet was a research and development project and it was used to support the learning of general paper, physics and chemistry. These pilot studies built the foundation of Master Plans for ICT in Education.

First Master Plan for ICT in Education (1997-2002) was launched by Minister of Education Chee-Hean Teo in 1997. Mp1 had four goals; enhancing links between the

school and the world around it to expand and enrich the learning environment, encouraging creative thinking, lifelong learning and social responsibility, generating innovations in education and promoting administrative and management excellence in the education system. Curriculum and assessment, physical and technological infrastructure, content and learning resources and human resources development were the key dimensions of Mp1. At the end of the Mp1, all schools were provided with the necessary physical and ICT infrastructure for ICT-based teaching and learning. Primary schools had a pupil-to-computer ratio of 6.6:1 and secondary schools had a ratio of 5:1. Teachers gained essential ICT competencies and also they accepted ICT as a pedagogical tool in the classroom (Seng & Choo, 2008).

Second Master Plan (2003-2008) was launched in 2002. Mp1's underlying philosophy ensuring that students gain the necessary skills and knowledge for ICT remained relevant to Mp2. A systematic and holistic approach was adopted to address all key areas relating to the effective use of ICT in education. These key areas are alignment of curriculum, instruction and assessment, provision of ICT-enabled infrastructure and support, availability of ICT-based learning resources, ongoing professional development, research and development on the effective use of ICT-based learning resources, tools and pedagogies and the possible use of technologies in school environments. At the end of the Mp2; students achieved in the use of ICT tools and they learned how to use internet. Teachers were also proficient in the use of ICT tools and 2:3 of teachers supported their classroom teaching with ICT resources. All schools had funds to attain students to computer ratio of 6.5:1 for primary and 4:1 for secondary schools. Singapore MOE has also mentioned that Singapore had done well internationally after these achievements. They ranked 5$^{th}$ in the Global IT Report 2008 and 7$^{th}$ in the Global Competitiveness Report (Seng & Choo, 2008).

Third Master Plan (2009-2014) was launched in 2008 by the Ministry of Education. Mp3 continued the vision of the first and second master plans to transform the learning environments of the students and to equip them with necessary competencies. Minister of Education, Dr. Ng Eng Hen's speech was important to show the past and the future of ICT master plans in Singapore:

> *"Well-trained teachers using technology to multiply their efforts are a formidable combination to achieve our educational goals. Since the launch of our ICT Masterplan, we have witnessed how through sight, sound and interactivity, ICT can enrich the learning environment and better engaged the learner. Teachers now have a valuable tool to customize learning approaches and outcomes for each student. We should press ahead on both fronts-in teacher training and ICT development. If we can do both well, the school environment will be transformed for the better."*

Mp3's goals were included that school leaders provided the direction and created the conditions to harness ICT for teaching and learning, teachers had the capacity to plan and deliver ICT-enriched learning experiences for students to become self-directed and collaborative learners and ICT infrastructure supported learning

anytime, anywhere. There are 5 key strands of Mp3 implementation strategies; ICT in curriculum, pedagogy and assessment; cyber wellness; professional development; research and development; ICT and infrastructure. Achievements of the Mp3 were given in the ICT Connection and OPAL portals for the education shareholders in Singapore. Now Fourth Master Plan (2015-2020) was developed by the Singapore MOE. Mp4 continues to build on the achievements of the first three master plans and tries to improve the self-directed learning and collaborative learning. Mp4 focuses on quality learning and is aligned to student-centric and values-driven education. Students will be future-ready and responsible learners, teachers will be designers of learning experiences and environments and school leaders will be culture builders with the achievements of the Mp4. MOE adopts four approaches to implement the Mp4 regularly in school environments; deeper ICT integration in curriculum, assessment and pedagogy, sustained professional learning, translational research, innovation and scaling, connected ICT learning Ecosystem (ICT Connection, 2015).

Government and MOE worked integrated and implemented systematic approaches year by year, related with past and future. Pedagogical factors, self-directed learning and collaborative learning approaches have always been taken into consideration in ICT integration in schools.

**Similarities and Differences between Singapore and Turkey in Case of ICT in Education**

It is possible to compare the implementations of two countries in a given period because Singapore and Turkey have started to implement ICT integration projects in similar periods. Thus, there are three similarities and three differences between these two countries.

The similarities are;

- Turkey and Singapore both started to implement ICT projects in 1980s. These were the years when computers became personal computers and started to diffuse on social lives. Both countries kept up with this technological development.
- They have governmental commissions related with ICT integration from the beginning of the first project. In other words, they wanted to discuss this issue as a govern policy and to perform it in a planned and systematic way.
- They tried to equip all schools with latest technologies from the beginning and also trained teachers with essential IT skills.

These are the necessary implementations for the ICT integration. However, considering the quality of education, the efficiency of ICT integration and use in schools and pedagogical concepts of the ICT projects, there are several differences between two countries:

- Singapore started to use ICT for computer-assisted learning and teaching activities in schools from the first pilot studies. However, Turkey has implemented ICT integration projects in order to teach computer skills to students and teachers.
- Singapore has always a vision, mission, goals, key dimensions, implementation approaches and expected outcomes for each project or project phase from the beginning of the first ICT integration process. Also, each phase is a-follow-up of the previous one. Previous step's results were evaluated and the new phase planned and implemented according to the shortcomings and strengths of the previous phase. However, in Turkey, until FATIH project, in other words until 2011, ICT integration projects carried out independent from each other. Previous project's aims, expected outcomes or results were not taken into consideration in the following projects (Özdemir, 2010). For the first time, ICT integration has been tackled with aims for learning and instruction process and with implementation strategies in FATIH project and announced by Ministry of National Education.
- Singapore evaluated results of the phases at the end of each project and related these results with country's success on international indexes about educational field (PISA, TIMSS, Global ICT Report, etc.) and supported the ICT integration process success with these rankings (ICT Connection, 2015). However, Turkey especially focused on quantitative data such as the number of distributed devices or the number of in-service trained teachers instead of the qualitative data such as the quality and effectiveness of educational activities.

## Results and Discussion

Turkey started to implement ICT integration with hardware distribution in 1985-1986 and constituted computer laboratories in schools. Moreover, "computer course" started in secondary schools. However, this course included only basic computer skills. In integration policy, "computer-assisted learning or teaching" concepts were missing. 70% of the total time, computer laboratories in schools were used for computer skills education and only 30% of the total time, laboratories were used for computer assisted learning until 1993 (Uşun, 2004). However, in Singapore, they started to equip students with computer skills and then they built their master plans for integrating ICT to all subject areas. The first pilot studies with ICT tools were conducted in different courses (Seng & Choo, 2008).

Turkey continued the ICT integration projects after 1999 with World Bank funds and continued the distribution of hardware to schools. However, there was a pedagogical lack in integration process. First of all, there was no clear information about the results of completed ICT integration projects and following phases have not been planned according to the previous phases' evaluations. The only thing the government did that they bought technological devices and gave them to schools. Teacher training was mentioned in reports but the qualitative dimension of these trainings were also skipped. Teachers stated that they wanted to share their ideas

with implementers of the project but no one consulted them during the integration process. They explained that they had problems such as technical malfunctions and ineffective ICT use in lessons and they emphasized that they did not gain enough favor from the in-service trainings, especially from the online trainings (Altın & Kalelioğlu, 2015). However, in Singapore, from the beginning of the projects, the vision, goals, approaches and key dimensions of them were determined, the projects were developed towards them, these variables were taken into account during the project, and the results of projects were commented towards them. Moreover, the pedagogical issues about ICT integration in all grade levels were defined in every time. In ICT integration, it is important not only to distribute the hardware to schools, but also to provide sustainability, to train teachers regularly and to provide efficient educational software packages. This is a significant difference between two countries.

Turkey started FATIH project in 2011 and it is now in progress. Within the scope of this project, tablet PCs are now being distributed to the students and smart boards are being given to the schools. The key dimensions that Singapore started to use in 1997 are now being used for FATIH project but ICT integration projects are independent from each other in Turkey. Previous projects were completed and technological devices were given to the schools. Now with the new project (FATIH), old computers are being collected and the new ones are being distributed. Ministry of Education tries to make cooperation with academic institutions but every time project team changes, cooperation ends.

Considering the questions at the beginning of the study, big scaled investigations should be conducted to find out comprehensive responses for those questions. In this study those questions are tried to answer by interpreting two countries' comparative situations. The first question was "What is wrong with ICT?" ICT implementations have been conducted in Turkey for many years and one can ask whether or not there is a problem with ICT integration while there is no significant difference in the quality of education. Considering the good practices about successful ICT implementations such as being done in Singapore, only obtaining technological devices and ability to use them and waiting for the positive effect on the quality of education are wrong in terms of ICT integration. Technological devices are only tools and the important point is to integrate those tools to schools to serve educational aims. There is also a general consensus among ICT studies that successful integration of ICT requires the involvement of students, teachers, school leaders and policy makers as part of the process (Fu, 2013).

The second question was "Is ICT is a necessity for education?" Education and training exist since first human being and in this age they can be discussed from various perspectives. However, it becomes a necessity to integrate ICT to the educational environments because of developments such as rapid access to information and admission of the technology into social lives. Tools and materials have importance in instruction and learning because information processing is required mostly in educational environments. Computer access is a necessary but not

a sufficient condition in learning and teaching process (Law, 2008). Thus, using ICT in education can be beneficial with contributing the development of some skills within the possibilities of country. ICT integration is essential, but it can be effective and beneficial when it will be implemented appropriate for the needs of the age as a supportive material for instruction and learning process.

The last question was "How should it be planned and implemented?" According to the histories of these two countries, developing countries should apply for international support for the effective ICT integration and adapt it to their own cultural structure. This suggestion was emphasized many years ago (Özdemir, 2009) that learning from the experiences of other countries is important and essential but today it has to be mentioned again. What have to be done is determining the aims, goals, outcomes while beginning an implementation with a governmental control system. The most important factors are evaluating the previous project or phase's results, determining the weak and strong aspects, transferring them to the following phases, and making the regulations according these aspects in the new implementations. Furthermore, while planning the ICT integration process, it is important to focus on using it in all subject areas of the learning and instruction process instead of focusing on the ability of using the technological devices.

## Conclusion and Recommendations

Singapore is far ahead of Turkey in terms of both quality of education and ICT integration in education. This study tried to emerge the components and variables considered in ICT integration by Singapore and Turkey and determine the Turkey's mistakes about the ICT integration process. To summarize, firstly, ICT integration in education means not only obtaining and delivering hardware to schools as in Turkey. It requires adopting technology to the other disciplines and using ICT to gain skills such as creative problem solving, critical thinking, collaboration and communication that the students are expected to have in 21$^{st}$ century. Secondly, both countries started ICT integration together but Turkey skipped the fundamental parts of the effective ICT integration which was universally accepted. Thus, Turkey should review and revise the ICT integration in education policy. Moreover all the stakeholders of the projects (administrators, teachers, students, parents etc.) should be kept in the process of projects, their support should be provided, and the process should be formalized according to their feedback getting their thoughts and views. Furthermore, resources, budget and time should be analyzed well and they should be planned in compatible way with each other. Thirdly, especially in the first years of ICT integration in Turkey, implementations were not planned and performed in a systematic way. This situation led to some problems in management, planning, implementing, evaluating and consequently useless projects. Therefore, for the effective ICT integration in education, the process should be organized systematically according to the results of the previous projects and implementations, international and national studies, tests, reports and evaluations.

This study is limited to compare Turkey and Singapore and it is limited to the PISA, TIMS, Global IT Report and the documents about the educational policies of two countries. It is recommended to investigate the current situations of Turkey and Singapore in terms of their educational policy and ongoing ICT integration process in a detailed manner. Educational technology studies can be investigated to identify the previous and current positions of the two countries. Because of the reason that cultural differences effect both project management (Elena, 2010) and business management (Cullen & Parboteeah, 2008) processes, there is also a need for comparing Turkey with the countries which have similar educational policies or cultural similarities. Finally, it is also recommended to conduct big scaled studies between the OECD countries in order to estimate their current situations, to relate to other countries and to plan and implement their own ICT integration processes effectively.

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# Impacts of Technology Enhanced EFL Reading Classroom on Student Learning and Achievement

**Zeynep Munzur***

## Abstract

Technology is considered one of the most important aspects of education. Today not only college education, but also language teaching is being challenged by the development of technology. Since technology is regarded as a powerful asset for the 21st century teachers and students, pedagogy must be a priority rather than technology itself. As institutions, schools and colleges change the way they teach due to new technologies, and convert their current curriculum and teaching strategies into newer ones to equip today's learners, a deeper understanding of the subjects and greater student success can be evidential. Therefore, an effective next generation teaching needs to fulfill the expectations of the 21st century in English as a Foreign Language (EFL). This paper presents students' attitudes to technology enhanced reading classroom, and its effects on their academic achievement at Kadir Has University School of Foreign Languages English Preparatory Program. From this analysis, if appropriate technology is integrated into reading lessons, the students seem to reflect a positive attitude towards reading. It is concluded that with a well-equipped and staged classroom presentation and instruction, deficient reading activities in the current text book became more communicative and collaborative by using technology. The results also reveal that students have become more efficient readers, and have achieved significant academic progress. The study implies that technology enhanced reading lessons have improved their motivation toward learning. However, it should be kept in mind that technology rapidly changes, so constant updating is required for such institutions and teachers. This work is primarily conducted, and seeks to shed light on the importance and benefits of technology enhanced classrooms.

***Keywords:*** technology, technology enhanced reading classroom, reading

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# Bilgi Teknolojileri ile Geliştirilmiş İngilizce Okuma Derslerinin Öğrencilerin Öğrenme ve Başarıları Üzerindeki Etkileri

## Öz

Teknoloji eğitimin önemli unsurlarından biridir. Günümüzde, sadece üniversite öğrencileri değil, dil öğretimi de teknolojinin sürekli gelişmesi ile karşı karşıya gelmektedir. Her ne kadar bilgi teknolojileri, 21. yüzyıl öğretmenleri ve öğrencileri için etkin bir araç olarak görülse de, pedagoji her zaman ön planda tutulmalıdır. Kurumlar, okullar ve üniversiteler eğer varolan öğretim programı ve öğretim stratejilerini yenilerler ise, o zaman öğrencilerin konuları anlamasındaki gelişim ve başarı düzeylerinde artış gözlemlenebilir. İşte bu yüzden, yeni nesle yönelik etkin bir öğretimin 21. yüzyılda İngilizceyi yabancı dil (EFL) olarak öğrenmedeki beklentilerini karşılayabilmesi gerekmektedir. Bu çalışmada, Kadir Has Üniversitesi Yabancı Diller İngilizce Hazırlık Programı'na devam etmekte olan öğrencilerin teknoloji ile geliştirilmiş okuma derslerine yönelik görüşleri incelenmiştir. Yapılan değerlendirmelere göre; uygun ve yeterli bilgi teknolojileri okuma derslerinin içeriğine uygulandığında, öğrencilerin okuma derslerine yönelik görüşlerinin olumlu yönde değiştiği gözlemlenmiştir. Doğru ders malzemeleri ve sıralama ile sunulan bir ders içeriği ve akışı, kurumda okutulan okuma ders kitabındaki yetersiz olan aktiviteleri daha iletişimsel ve işbirlikci bir öğretim haline dönüştürmüştür. Ayrıca elde edilen sonuçlar; öğrencilerin daha etkin okuyucular haline geldiğini ve gözle görülebilir akademik başarı elde ettiklerini göstermektedir. Bu durum, öğrencilerin okumaya ve öğrenmeye karşı olan tutumlarını da olumlu yönde etkilemiştir. Fakat, teknolojinin gün ve gün hızla gelişmesi karşısında, kurumlar ve öğretmenler için de güncelleme yapmak kaçınılmazdır. Bu ön çalışma ile, bilgi teknolojileri ile geliştirilmiş derslerin önemi ve faydalarının açığa çıkmasına ışık tutması amaçlanmıştır.

***Anahtar Sözcükler:*** teknoloji, bilgi teknolojileri ile geliştirilmiş okuma dersi, okuma

## Introduction

Effective reading is substantial for success in learning English as a Foreign Language (EFL) in higher education. It is considered as the basis of instruction in all areas of learning. Levine (2000, p.1) stated that "The ability to read academic texts is considered one of the most important skills that university students of English as Second Language (ESL) and English as a Foreign Language (EFL) need to acquire". Most foreign language (L2) learners have difficulty in comprehending a text due to lack of necessary strategies and metacognitive skills because "reading is a conscious and unconscious thinking process" (Mikulecky, 2008, p.1). Most students who enter in higher education are not well-prepared to cope with academic texts. As far as the researcher has discovered, Turkish students do not read much, and they have limited demands in high schools, and they have poor reading habits. In addition, the researcher's experience and observations suggest that EFL reading classrooms depending on traditional teaching and learning, which students sit and listen to their teacher, and take notes, do not provide the expected outcomes from a reading course.

Acquiring the knowledge of reading and necessary strategies in class, it is substantial that students need to "engage in tasks" (Edgerton, 1983, p. 32) because reading is "the ability to draw meaning from the printed page and interpret the information appropriately" as Grabe and Stoller defined (2002, p. 9). A reader needs to construct accurate information in the text followed by identfying the topic and structure of the text. This is very similar to an orchestra and a conductor because reading is a repertoire of strategies that needs systematic instruction and training. To read and comprehend a text requires "identification skills" and "interpretation skills" (Cohen, 1990, p. 75). Therefore, EFL learners in higher education need to acquire the necessary reading skills and strategies not only to cope with academic texts, but also with their real-life reading.

Many research suggest that a digital teaching environment potentially creates something new, and has significant impact on education (Roblyer, 2003; Roschelle, 2003). Digital resources such as PowerPoint, multimedia and social networking sites provide many possibilities for the development and application of technology in education. It is widely seen that "the relationship between teachers and students have undergone a phenomenal change" (Barad, 2009, p. 10) in this century. The impact of technology on learners has been the major interest for educators and researchers lately, and has played a major role in enhancing English as a second language. Seemingly, there are many factors influencing the application of technology in classrooms when benefits are considered. It is particularly noteworthy that the key to successful use of technology in education is provided by the institution and teachers. Kasper (2000a) suggests that the changing face of education encourages educators to develop effective methods of delivery or means for teaching reading so that learning could be endorsed. Teachers are seen as the primary guide for promoting technology in education and enhancing learning. That is why their impact provides us the necessary information about how technology is implemented and adopted in education, how it can be supported technically and personally. Technology Enhanced Learning (TEL) can play a prominent role in fostering skills in language learning in

the hands of teachers. That's why, the pedagogical approach of teachers is likely to be considered as core of this process. Teacher attitudes to the application of technology and classroom management skills should be guided by a particular theoretical model, which Selber (2004, p. 36) called this attitude toward technology a "tool metaphor". He claimed that "from a functionalist design perspective, good tools become invisible once users understand their basic operation". According to Owsten (1997), it is the teacher's role to encourage students to explore new things, compare different viewpoints of the problem, analyze and synthesize diverse sources of information, and construct their own understanding of the topic or issue at hand.

As a result, students are encouraged to develop their critical thinking and problem-solving skills in reading, writing, listening and speaking. Roles and practices in language classes vary according to the adaptation of technology; therefore, it would be a good idea to keep in mind that technology rapidly changes, and constant updating is required for such institutions and teachers.

## Technology and Education

Technology and multimedia technology are powerful assets for the 21st century teachers and students. Technology seems very appealing to teachers and students, but its functional power on learning, teaching and assessing reading should not be underestimated. Research claims that technology is often considered to be a valuable tool for increasing educational benefits and instructional quality (Dexter, Anderson & Becker, 1999) if pedagogy is considered as the main concern. According to Graddol (1997:16); "Technology lies at the heart of the globalization process; affecting education, work and culture"; however, the rapid change in education and technology leads to a lot of arguments and discussions about the terms 'educational technology' and 'technology in education'. If we want to enhance learning with technology, it is good to clarify these two terms so that an appropriate approach could be implemented to design our lessons. "Educational Technology is the study and ethical practice of facilitating learning and improving performance by creating, using and managing appropriate technological processes and resources" Januszewski & Molenda (2008, p.1). Another definition made by AECT (1977, p.1-2) is that "Educational technology is a complex, integrated process involving people, procedures, ideas, devices, and organization, for analyzing problems and devising, implementing, evaluating, and managing solutions to those problems, involved in all aspects of human learning". On the other hand, "Technology in education is the application of technology to any of those involved in operating the institutions" (Januszewski & Molenda, 2008, p.2). That includes the function of digital devices as instructional tools for education. Therefore, it is important to reconsider the word 'technology' and 'enhancement' while thinking of pedagogic approaches to using technology for learning. Technology in education offers more plentiful and colorful materials than textbooks. It provides vivid cultural background, rich context, natural life and true life materials for students. These materials not only improve their abilities or skills, but also they help them learn cultural, social and natural information. They can equip the learners with diverse knowledge, and make them

share and actively participate with others in class as research suggest that "Language learning is assisted through social interaction of learners and their interlocutors, particularly when they negotiate toward mutual comprehension of each other's message meaning" (Long 1991, Chapelle 2001, Pica, 1994, Long, Kanagy and Falodun 1993,11).

**Technology Enhanced Learning**

As teachers change the way they teach due to new technologies, the traditional pedagogy, which requires face-to-face interaction in class, is replaced by technology enhanced teaching and learning. This can provide a deeper understanding and learning, and greater student success in all areas of English language learning. Interest in pedagogic theories and processes for the use of technology has been a hot topic in the last decade, and integrating technology in foreign language classrooms is still debatable. Research suggests that technology enhanced learning has failed to have the expected impact on learning processes (Attwell & Huges, 2010, p.15); however, in Europe and other parts of the world, it has been stated that "technologies can enhance learning". So, it might be good to have a deep understanding of the term 'Technology Enhanced Learning' (TEL). In brief, it refers to "the application of information and communication technologies to teaching and learning" (Kirkwood, Adrian and Price, Linda, 2014, p.2). In other words, "it is anything online that directly supports learning and teaching" (Walker, Voce and Ahmed, 2012, p.2). The word 'enhance' is defined as "to increase or improve in value, quality, desirability, or attractiveness" in Merriam Webster Dictionary. In order to design technology to enhance a lesson regarding the definitions, there are some concerns about;

- how much we should increase technology use,
- which educational activities we should integrate,
- how we can improve student learning outcomes both quantitatively and qualitatively.

In this study, the above concerns were taken into consideration, and the lessons were designed accordingly by the researcher. She believes that if the right amount of technology is integrated into the lesson with the right pedagogy, it facilitates reading comprehension development and academic achievement. Moreover, many studies have shown that TEL motivates and engages the learner in the learning process. When teachers give more chance in their tasks, those tasks become more meaningful and students gain a sense of responsibility of taking care of their learning. Furthermore, research indicates that TEL has enlightened students' critical and communicative skills positively in learning English. Studies suggest numerous benefits of TEL, and the most significant ones are;

- it helps students become active, motivated and involved in language learning process
- it increases students' interest in the classroom (Mayora, 2006).

- technology equipped classroom encourages not only students but the teacher also in a positive way (Jonassen, 2000).
- it provides a good opportunity to develop and create different and enjoyable tasks in the EFL classroom (Genc Ilter, 2009).

## Learning and EFL Reading

It is crucial to understand the meaning of learning in technology enhanced reading classrooms. In a broad definition, "Learning refers only to significant changes in capability, understanding, knowledge, practices, attitudes or values by individuals, groups, organizations or society" (Coffield, 2008, p.7). Learning also requires mental processes and interaction between individuals and their environment. Technology enhanced learning involves participation in a community of practice, and social engagements which provide a context for learning in the classroom. Kirkwood and Price (2014) have proposed three characteristics, which the researcher has granted her reading lessons.

| | |
|---|---|
| ✓ operational movement | e.g. providing greater flexibility for students, making resources more accessible |
| ✓ quantitative change in learning | e.g. increased engagement on tasks, students achieving improved success in test scores |
| ✓ qualitative change in learning | e.g. promoting reflection on learning and practice, deeper engagement, richer understanding, raising awareness, improved reading strategies |

A major issue and perhaps one that deserves further research is how a deficient reading text book can challenge and foster learning for 21st century students, who are Next Generation Learners (NGL) because they are "attached to their technologies, emotionally and in terms of personal organization and practice: they benefit from being able to use personal technologies and access personalized services in institutional contexts" (Beetham, 2009:24). NGL are tech savvy, and new pedagogies are needed to promote learning for them. Franklin and van Hammelen (2007) pointed out the need for new pedagogies and assessment methods. According to Doolittle and Camp (1999), this new pedagogy should be "based on the dynamic interplay of mind and culture, knowledge and meaning, and reality and experience". In other words, a constructivist pedagogy could be applied by using the correct technology such as Web 2.0 in the right place and time in class. Doolittle and Camp suggest eight principles of constructivist pedagogy that the researcher based her reading lessons:

- Learning should take place in authentic and real-world environments...
- Learning should involve social negotiation and mediation...
- Content and skills should be made relevant to the learner...

- Content and skills should be understood within framework of the learner's prior knowledge...
- Students should be assessed formatively, serving to inform future experiences...
- Students should be encouraged to become self-regulatory, self-mediated, a self-aware...
- Teachers serve primarily as guides and facilitators of learning, not instructors...
- Teachers should provide for and encourage multiple perspectives and representations of content.

**Motivation in EFL Reading**

Students sometimes have prejudices against reading. They do not like reading in their native (L1) language, and they know that reading needs more commitment than learning grammar. The researcher has witnessed that reading especially reading academic texts are challenging because it demands more effort and concentration. Students know they need more strategy training in the lessons, and more texts that they could exploit their strategies. Providing authentic texts, and helping them to skim and scan those texts would make them engaged more in reading than complaining about books or the course. In addition, they have to deal with words, structures and questions "many different things at the same time" they say. Moreover, the readings in the textbook are not their area of interest. Therefore, they get bored of reading similar deficient texts, so they lose their interest and motivation. They develop some kind of negative attitude toward reading. Krashen (1982) claimed that this negative attitude works like a filter and prevents them to acquire the relevant strategies. When learners are not anxious but motivated, they provide more satisfactory results (Alderson, J. C. & Urquhart, A. H. 1984). Bastidas (2006, p.154) pointed out that "motivation is a dynamic and an interactive process composed of beliefs, wants, reasons, and goals mediated by socio-cultural and historical conditions to learn a second or a foreign language". Moreover, Ryan and Deci (2000, p.54) stated that "To be motivated means to be moved to do something... Someone who is energized or activated toward an end is considered motivated". If the reader is motivated, s/he will show interest in learning, get pleasure out of reading and achieve success. Motivation enables the reader to learn effectively and make connections with real life. In this context, technology enhanced reading classroom is considered as motivational and engaging because the research suggests that when students are given more chance in doing tasks, they become more meaningful, and increases the students' intrinsic motivation (Jordan & Hendricks, 2002).

**Facebook and EFL Reading**

It is an undeniable fact that social media has also influenced teaching and learning English. Social media or the so-called Social Network emerge in different forms such as Facebook, Instagram, Twitter, etc. According to many research, "the

most popular among them is Facebook" (Acharya, Patel and Jethava, 2013, p.528). Most students use Facebook to communicate with their friends by sharing texts, photos, videos or opinions. The researcher suggests that Facebook could also be considered as part of learning if integrated and applied appropriately. According to her experience, teaching via Facebook could enhance motivation and promote learning because students could ask questions, post tasks, read online or join in a discussion and have fun while learning.

As many of us know, one feature of Facebook is closed groups. As far as the researcher has discovered, a closed Facebook group could provide communication among the group members and the teacher during a course. Teacher and students could share text messages, images, answer keys, videos files, word documents, etc. It has been witnessed that Facebook offers asynchronous and synchronous communication and learning opportunities in a reading course. In this study, Facebook offered audio visual communication, online reading and discussion board, sharing documents such as Pdf, Word doc., and assignments. Black (2008, p.15) stated that "Technology provides a series of electronic platforms and tools that support many language learning activities from the most mechanical drill-and-kill exercises to fully communicative real time conversations". As we know, language learning does not only occur in the classroom; it should continue outside the classroom. Technology enhancement offers teachers and students the ability to work without time and location constraints. It frees teaching and learning "From the physical boundaries of classrooms and the time restraints of class schedules" (Owsten, 1997, p.27). Nowadays university students do not know a world without computers, and technology is integrated in every part of their lives. So, the researcher took advantage of this, and provided synchronous and asynchronous learning environment via Facebook.

## Integration of Facebook into EFL Reading Classroom

The researcher created a closed group on Facebook because the students did not prefer any other digital classrooms such as Edmodo, or Blackboard, and they agreed that Facebook is one of the most popular among them. In this study, the group policy had been negotiated by the teacher (the researcher) and the learners. One of the students volunteered to be the admin of the group. Students were highly enthusiastic about the idea that they would share ideas, discuss in English with all classmates, and their teacher outside class. They were also able to access course resources such as PowerPoint lessons or Word documents provided by their teacher, so that they could benefit from them at home as well. They were motivated by posting their views about their assignments, or related photos and videos.

The control group started as a repeat B1 level, and they did not have any motivation to learn or to do anything in class. They also had no intention of doing extra work at home. The situation looked very challenging both for the teacher and the students. However, with the promotion of the closed group on Facebook, learning outside class was endorsed, they were not left alone with their books or assignments

at home. This group enabled them to work with their friends, and they knew that their teacher was a mouse click away. If they were not able to finish their tasks in class, they had the opportunity to complete them at home, and share them in the group. In other words, Facebook provided flexibility and freedom during their learning process.

The researcher also tried to encourage her students to explore the digital world by assigning tasks, which she thought they would give them the opportunity to develop their communicative and written skills on the computer. To exemplify, one of the tasks was to find relevant videos for the current theme in their book. They had to do some careful research because the videos should be at their level of understanding, interesting and to the point. Such assignments made them unbelievably enthusiastic and motivated. They watched videos and shared their opinions on Facebook. The group created a platform to share ideas and collaborate. They became ready for oral discussions after they practiced writing on Facebook. Moreover, the assigned group sent some relevant videos, and the teacher chose the suitable ones, and inserted them on her PowerPoint slides. During the lesson, when they saw that their videos were turned into a teaching material, they felt the sense of accomplishment in their learning process.

Besides fun and educational motives of Facebook, all of these tasks served for pedagogical purposes such as activating schema, which has a significant role in reading lessons. As research suggests activating schema, prior knowledge, is an important skill for readers (Hedge, 2000). When learners are familiar with the content, it is easier to use strategies on the material. When students do not have an idea about the topic in the text, they are more concerned with trying to understand what is in it instead of strategies. Hence, it is distracting dealing with an unfamiliar content for students. Most students lack general knowledge or not confident enough to make some predictions that relate the textual knowledge. However, Facebook and interactive PowerPoint method of delivery in this study enabled students feel more confident before working on the reading texts.

**Integration of PowerPoint into EFL Reading Classroom**

As all educators, lecturers or instructors, we are all familiar with the use of PowerPoint (PPT) in our classrooms. However, the researcher tried to vary the use of PPT by integrating different items on the slides. First of all, the PPT starts with different topic related videos inserted in the slides in order to activate schemata. The students are always asked to watch similar videos via YouTube or Facebook. The videos are followed by discussion questions to engage the students into the topic. Then, there is an interactive target vocabulary teaching and practice. There is a variety of activities ranging from the forms of the target vocabulary to using them in context through teacher-designed activities or games. The teacher prefers more digital work because she believes that these activities are more motivational than traditional pen and paper ones. The PPT proceeds with skimming and scanning

activities, which were also created by the teacher. PPTs provided variety and fun for the students.

One piece of reading approximately takes 100 minutes, which makes two lessons in the current institution. PowerPoint and other technological tools or items are provided to the students during the lesson. Lastly, the teacher sends some parts of the presentation to the Facebook group after the class in order to make them revise at home, and Facebook communication continues after class.

## Method

### Methodology and Research Plan

The first stage of the research was to conduct a survey to collect data on student attitude towards exposure to technology enhanced reading classroom vs. traditional classrooms. The second stage was to collect secondary data to compare their academic performance after the students had been exposed to technology enhanced reading classroom.

### Setting

The study was conducted at Kadir Has University, School of Foreign Languages, and English Preparatory Program. It is located in Istanbul. It has approximately 900 students including international students. The data was collected during the academic year 2015-2016.

### Participants

The study participants were 17 English language preparatory program students (*n*= 17) who studied a 16-week academic term. Eight female and nine male students, whose ages range from 18 to 20, studied repeat B1-B2 (Intermediate). Students were assured that the information supplied in the questionnaire was confidential and was to be used for research purposes only.

### Research questions

The current study examines the impacts of technology enhanced reading classroom. The following research questions were examined:

1. What are the students' perceptions about the technology enhanced reading classroom?
2. Does technology enhanced reading classroom instruction enable students to change their attitude toward learning compared to traditional teaching and learning (face-to-face classrooms)?
3. Does technology enhanced reading classroom instruction help students improve their academic performance?

Answers to these questions would serve as groundwork for alternative studies, suggestions and recommendations**.**

**Research Instrument and Data Collection**

The curriculum of the institution is based on integrated skills. There is no main course in the curriculum. The academic term aims to improve students' academic reading, writing, listening and speaking. Therefore, the course is based on two books. A reading and writing book (QSkills 3 and 4, by Oxford Publishing) was taken as basis of this preliminary study. The book is designed thematically that focuses mainly on an event or a problem situation.

The primary purpose of this study was to research the attitude of EFL learners in relation to the technology enhanced reading classroom, and whether there was progress in learning and their test scores. Data was collected mainly from two sources. The first stage was to explore students' perception on technology enhanced reading teaching and learning. The second stage was to see the progress in their academic performance. The first stage of data collection instrument was a questionnaire, which the items were based on the relevant literature. The questionnaire was designed in simple and clear language to avoid misunderstanding to the participants. There was a pilot questionnaire with 30 questions. However, some questions were repeating themselves, or they lacked content reliability. Therefore, the researcher thought that several items should be removed from the instrument. The final version of the questionnaire consisted 18 questions. It was used as a main instrument to elicit data from the students. The first part consisted questions about technology enhanced reading classroom. A Likert Scale with four points was used for responses (strongly agree, agree, neutral and disagree). The second part of the instrument consisted a free writing section that participants could write their comments about technology enhanced reading classroom and face-to-face classroom. The data gathered from the questionnaire was shown in relevant tables. The data was not analyzed by SPSS program due to the lack of the number of participants and variables.

The second stage of the data was gathered from the tests administered by the institution. There were four tests every three or four weeks. The results of the tests showed the progress of their achievement in the reading section. The tests were used to measure students' academic achievement to see if there was a relationship between the method applied in reading classes and traditional method of instruction.

## Findings

The findings are given in percentages by taking the number of 'Strongly Agree' responses into consideration.

## Students' Perceptions about Technology Enhanced Reading Classroom

Table 1

*Students' Perceptions: Strongly Agreed responses*

| ***Qs*** | ***Q1*** | ***Q2*** | ***Q3*** | ***Q4*** | ***Q5*** | ***Q6*** | ***Q7*** | ***Q8*** | ***Q9*** | ***Q10*** | ***Q11*** | ***Q12*** | ***Q13*** | ***Q14*** | ***Q15*** | ***Q16*** | ***Q17*** | ***Q18*** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **%** | 83 | 100 | 78 | 83 | 0 | 72 | 78 | 72 | 88 | 72 | 72 | 61 | 78 | 61 | 67 | 72 | 11 | 83 |
| ***n=*** | 15 | 17 | 14 | 15 | 0 | 13 | 14 | 13 | 16 | 15 | 13 | 11 | 14 | 11 | 12 | 13 | 2 | 15 |

Table 1 shows the total responses of 'Strongly Agree' in percentages given by 17 participants. The data obtained from them show mostly positive views about the technology enhanced reading class. Firstly, according to the results mentioned in the table, it could be concluded that there was no significant evidence of negative attitude toward using Facebook and PowerPoint to endorse reading skills. Question 9 showed that 88% of the respondents strongly agreed that Facebook group helped them work collaboratively, and make them responsible for their own learning. In addition, question 4 revealed that 83% of them strongly agreed that PowerPoint presentation was more motivating and engaging than a traditional instruction in reading classes. 100% of the respondents strongly agreed that authentic materials (e.g. YouTube videos, TED Talks, podcasts, etc.) provided outside class helped them engage in, and understand the content of the reading, and provided background information about the readings. Only 6% responded 'Agree' with the statement. 72% of the respondents for question 10 strongly agreed that the teacher acts as a facilitator rather than an expert in and outside class, which gave them more freedom in the learning process. However, 24% consisted 'Agree' and 4% was 'Neutral'. Moreover, the result of question 11 showed that 72% of the students were happy to drive their learning using technology with the guidance of their te8acher. None of the students for question 5 agreed that using technology in and outside classroom made the lesson boring and prevent their learning.

As the table indicates, 61 % strongly agreed that their test scores were improved. The results of the tests and the progress the participants had made are shown in Table 2. Therefore, the result of this question and the results correlate, since there was no or slight progress in the sores of six participants. Another important result of this study is that 83% thought that the use of technology promoted their interpersonal skills (e.g. ability to discuss or work with others). In addition, the same amount of response was given to question 1, which the participants agreed that their motivation towards reading lessons have increased. As it can be seen from the table that there are a few responses including Agree or Neutral, which were not included in the table. The 'neutral' answers will be investigated in another study.

### Student comments on reading lessons

The second part of the instrument included qualitative results, which included written feedback from the participants about the lessons. Feedback revealed that technology enhanced reading classroom endorsed their reading skills. They were

given more freedom and more opportunity for doing the tasks. They could also practice all skills (listening, speaking, reading and writing) during the learning process. Moreover, technology promoted their interpersonal skills such as working collaboratively with others. Although they were hesitant in the beginning, they realized the benefits of these lessons. It took them some time to get used to this method, but by the end of 16 weeks, they became more autonomous in learning as they claimed. They also stated that their achievement had also shown significant progress due to the work they had on Facebook. Overall, they agreed that they enjoyed the lessons and Facebook activities. Therefore, they responded mostly "Strongly Agree" in the questionnaire. The following statements exemplify their views about learning reading with tools of technology.

> *'My reading was worse at the beginning of the year but now it is good thanks to technology. I enjoyed the course'*. E. A.
>
> *'I think, we all improved our reading skills thanks to Zeynep teacher because she cares us and she did a lot of reading with PowerPoint. Lessons were fun.'* D. D.
>
> *'I think technologically designed reading is good for motivation. Learning is better than traditional reading because traditional is boring'.* E. Y.
>
> *'You were giving me a lot of materials. We were doing a lot of practice for the exam. Also, you were using the best of technology in class'.* M.A
>
> *'My perspective has changed. Reading is that I most fear in exams but now I feel more ready.'* B.O.

**Progress in Academic Achievement**

Table 2

*Results of Reading Section in Midterm 1 and Final Exam*

| Student | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | Average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MT1 | 14 | 18 | 16 | 10 | 22 | 20 | 18 | 22 | 10 | 10 | 14 | 14 | 18 | 16 | 0 | 14 | 20 | 15.06 |
| Final | 14 | 20 | 22 | 20 | 22 | 28 | 22 | 24 | 22 | 22 | 18 | 14 | 30 | 16 | 16 | 20 | 26 | 21.42 |

Table 2 indicates the progress of the respondents in the beginning and the end of the academic term. The total score of reading section in the exams is 30 points. The results show only the scores of reading section. Evidently, some students showed slight progress between the first and the last test, whereas two of them stayed the same. Students' number 13 and 15 showed significant progress. Among all the students, number 13 achieved the total score in the reading section, which means he showed 40% improvement. Student 15 was not successful in Midterm 1, but he

achieved quite a good score in the end by showing 53% progress. However, it was not enough for his overall success in the exam. It is also strange to see that there was no progress in Students 1, 5, 12 and 16 at all. They stayed the same, but there might be outside factors that had influenced their progress. Other students; number 2 and 7 showed 23% progress, while two of them had 100% progress in their tests. The results of these tests indicate that there is an average progress in their academic achievement. There were other factors influencing their exam results, but they were not taken into consideration during the study. As all the students in the study started the term with no motivation due to their failure in the first term, this improvement could be considered positive. Below is the overall results of the tests that were administered during the academic term.

Chart 1

*Overall Results of the Tests*

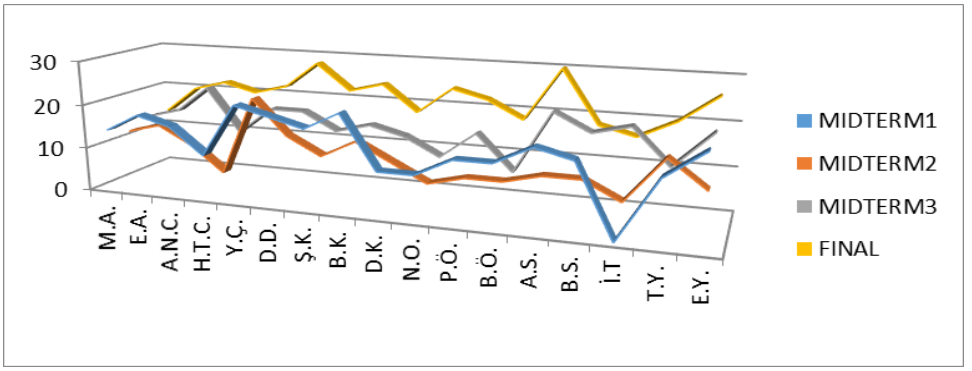


Chart 1 shows the results obtained from the tests that were administered at the institution. There were 3 midterm exams and a final exam in one academic term. Most students showed significant progress in their tests. That is to say, there was a clear evidence between their academic achievement and technology that the teacher used in reading lessons. In the light of the results illustrated in the chart, Final exam was the most successful. The chart indicates that most students have shown progress between Midterm 1 and the Final exam as stated above, whereas a few have shown slight progress, and one student was unsuccessful in the final exam. The results in the chart reveal the effects of technology not only in reading, but also in other areas of the test such as writing. Since the students had practiced a lot of writing and listening on Facebook, the progress was evident in tests.

**Outcomes of the Technology Enhanced Reading Lessons**

In the study, the researcher has found out that there are significant benefits of technology enhanced reading lessons:

- Students took control of their learning process
- Students learned from each other actively

- The teacher became a facilitator, not an expert in class
- Students benefited from collaborative learning
- Students were able to see the difference between a technology enhanced reading classroom and face-to-face classroom
- Students were able to achieve higher scores in tests

As a result, the tentative data indicates that technology endorsed critical thinking, problem solving, oral and written communication, and the ability to work collaboratively outside class more efficiently than face-to-face traditional methods of delivery.

## Conclusion and Suggestions

This study revealed that students have positive attitudes towards a technology enhanced reading classroom. The results showed that using a social networking site such as Facebook, and the use PowerPoint effectively in classroom endorsed their reading skills and learning. Moreover, there was a significant progress in their academic performance in class and tests. Students' reading motivation was promoted by using technology in and outside classroom. I hope the present study will help both teachers and students take a step forward to innovate their reading classrooms, and new technology applications should be used to reinforce EFL reading to become the most favorable activity for students in the future.

This study was implemented on a small sample, which limited the study's outcomes. A further research is recommended with larger groups of EFL learners to generalize the significant outcomes. In addition, more quantitative and qualitative methods such as SPPS or observations should be conducted to compare the advantages with the disadvantage. Lastly, more research is needed to assess the impacts of technology enhanced classroom with other skills such as listening, speaking and writing, as well as with different levels of students.

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# Pedagogical Problems Encountered by Teachers and Students in Technology-Enhanced Learning Environments: A Case of FATIH Project

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## Abstract

The aim of this study was to investigate pedagogical problems encountered by teachers and students, who participated in pilot implementation of the Increasing Opportunities Improving Technology Movement (FATIH) project, from the perspective of teachers, students and schools school principals. To support schools with educational benefits of information and communication technologies Turkish government launched the project across Turkey. The sample of the study consisted of 167 teachers, 667 students and 31 schools school principals, who participated in the project from four cities on the east region of the Turkey. The data were collected through Likert scale surveys and group interviews. The questionnaires were applied online to the teachers, students and school administrators. After the quantitative data collected, focused group interviews were conducted with the identified students, teachers and school administrators. While quantitative data were subjected to descriptive analyzes, qualitative data were subjected to content analysis. Although quantitative and qualitative results show some differences, both qualitative and quantitative findings show that teachers having difficulty in classroom management, they lost their leader role, communication and interaction with their students after integration of information and communication technologies. Regarding problems encountered by students, it was found that, these technologies cause many pedagogical challenges such as new classroom technologies' distracting students' attention, leading students' spending most of their time with them, causing students to become passive learners and use these technologies for gaming only.

***Keywords:*** FATIH project, Pedagogical problems, ICT

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# Teknoloji Destekli Öğrenme Ortamlarında Öğretmenler ve Öğrencilerin Karşılaştığı Pedagojik Problemler: FATİH Projesi Örneği

## Öz

Bu çalışmanın amacı, Fırsatları Arttırma ve Teknolojiyi İyileştirme Hareketi Projesinin (FATİH) pilot uygulamasına katılan öğretmen ve öğrencilerin; öğretmenler, öğrenciler ve okul müdürlerinin bakış açısından karşılaştıkları pedagojik sorunları araştırmaktır. Türkiye Cumhuriyeti Hükümeti, okulların eğitimde Bilgi ve İletişim Teknolojilerinden yararlanmaları için FATİH projesini Türkiye çapında başlatmıştır. Araştırmanın örneklemini; Türkiye'nin doğusunda yer alan dört il merkezinde projenin pilot uygulamasına katılan 167 öğretmen, 667 öğrenci ve 31 okul müdürü oluşturmaktadır. Veriler likert ölçeği anketleri ve grup görüşmeleri ile toplanmıştır. Anketler projede yer alan okullardaki öğretmenlere, öğrencilere ve okul yöneticilere online ortamda uygulanmıştır. Toplanan nicel veriler analiz edildikten sonra belirlenen öğrenci, öğretmen ve okul idarecileri ile odak grup görüşmeleri yapılmıştır. Nicel veriler betimsel analizlere tabi tutulurken, nitel veriler içerik analizine tabi tutulmuştur. İçerik analizinin güvenirliğini sağlamak için veriler iki araştırmacı tarafından analiz edilerek tutarlılık katsayısı hesaplanmıştır. Nicel ve nitel sonuçlar bazı farklılıklar göstermesine rağmen bulgular öğretmenlerin sınıf yönetiminde zorluk çektiklerini, sınıftaki lider rollerini kaybettiklerini, bilgi ve iletişim teknolojilerinin entegrasyonu ile birlikte öğrencileriyle olan iletişim ve etkileşimlerini kaybettiklerini göstermektedir. Öğrenciler açısından ise; yeni teknolojilerin öğrencilerde dikkat dağınıklığına yol açtığı, öğrencilerin zamanlarının çoğunu bu teknolojilerle oynayarak geçirmelerine neden olduğu ve öğrencilerin pasif hale gelmesine neden olmak gibi birçok pedagojik soruna yol açtığı ve öğrencilerin bu teknolojileri sadece oyun oynamak için kullandıkları öğretmenler, öğrenciler ve okul müdürleri tarafından dile getirilmiştir.

***Anahtar Sözcükler:*** FATİH projesi, pedagojik problemler, BİT

## Introduction

It is widely accepted that the most effective way of preparing people for the information era is integrate information and communication technologies (ICTs) into education. Thus, much is invested in people so that they can utilize such technologies and educational institutions are equipped with ICTs to ensure more effective education (Pelgrum, 2001; Watson, 2001). Although policy makers believe that integrating ICTs would lead to major improvements in education (Cuban, Kirkpatrick & Peck 2001), this is not the case. There are a number of factors such as economic, social and psychological caused by innovations affect the success of integration of ICTs into educational environment. In order to understand the extent at which the integration is successful, it is important to deal carefully with mentioned factors that hinder the integration (Butler & Sellbom, 2002; Watson, 2001).

In the literature, factors challenging integration of ICTs in educational environment are divided in different categories. Some studies placed those factors in four categories as resources (1), institutional and administrative support (2), training and experience (3), and attitudinal or personality (4) (Brinkerhoff, 2006). Other studies categorized them as teacher-related, school-related and system-related factors (Balanskat, Blamire, & Kefala, 2006). Still other studies classified as intrinsic and extrinsic factors (Ertmer, 1999). In these studies, it is evident that mostly pedagogical impacts of ICTs are being neglected and more attention is being paid to technical challenges encountered by teachers, students and administrators in the process (Pelgrum, 2001; McCormick & Scrimshaw, 2001; Goktas, Gedik, & Baydas, 2013). However, more emphasis should be placed on to pedagogical factors for the sake of success (Lipponen, 1999) because even in famous debate about media vs. method in instructional technology field both Kozma (1994) and Clark (1994) agree, "it is the selection of [instructional] method, not he medium, that is practical importance for learning" (Kozma, 1994, p. 16) When we looked at the definition of pedagogy, it is defined as art or science of teaching; instructional method. Therefore since pedagogy or instructional method plays a key role in the learning, it is necessary to give more emphasis on pedagogy. While investigating pedagogical effects of ICTs, it must be understood well that pedagogy contains interrelated variables such as learning outcomes, perceptions concerning learning and knowledge, learning and measurement activities, learners' roles and relations as well as teacher-student interaction and classroom atmosphere (McCormick & Scrimshaw, 2001).

In addition to giving more emphasis on technical challenges, the studies about effects of ICTs on learning mostly investigate positive effects. They deal with how innovations affect students' motivation, learning, self-confidence and studying habits (Balanskat, Blamire, & Kefala, 2006). However, ICTs have negative effects besides positive ones. Negative effects, for example, include using of computers for playing games instead of learning, losing conventional skills and using knowledge roughly (Jagdish, 2006). In this sense, the aspects, which obstruct learning or pedagogical problems arising from innovations, should be dealt with carefully so that innovations can be used more effectively in teaching and learning process.

Deaney, Ruthven, & Hennessy, (2003), in a study investigating secondary school students' views about ICTs, found that the students state most of the benefits of ICTs but they are concerned that such technologies might hinder effective and efficient instruction. Some of the students think that ICTs will probably hinder understanding of maths and applied science at conceptual level, decrease teachers' interaction with students and teachers' role can be weaker as they accept assistance from students. In another study, the factors such as difficulty of integrating ICTs into teaching; teachers lacking knowledge and skills; incompliance of software and curriculum, students' ability of using the technology better than teachers and difference between program language and teaching language were found to hinder integration of ICT (Pelgrum, 2001).

Webb and Cox (2004) in a review study, made some recommendations to develop a pedagogical model for integration of ICTs into education. It is given that teachers should use the instruments relevant to learner characteristics as well as content knowledge for effective teaching. It is underlined that students' attitude, views and skills regarding ICTs should be considered for effective teaching. It is recommended that concepts of cooperation with students in learning and monitoring should be managed well by teachers. Within the context of this model, it is also suggested for teachers to develop strategies for involving students in the lesson while controlling them at the same time.

Another factor hindering integration of the technologies is related with production processes of these technologies. During the development of information and communication technologies in education, much attention is not being paid on how they will be used in education and what kind of possible changes they will lead in educational setting. Special emphasis is placed onto taking into consideration of dealing with and discussing learning and instruction conditions diligently to gain more educational benefits from these technologies (Laurillard, 2009; Pelgrum, 2001; Watson, 2001).

To support schools with educational benefits of ICTs Turkish government launched the Increasing Opportunities Improving Technology Movement (FATIH) project across Turkey (Ministry of National Education (MoNE), 2013). With this project, it is planned to equip 42.000 schools and 570.000 classes with the latest ICTs (MONE, 2013). The aim of the project is to enable equal opportunities in education and improving teaching and learning process with the help of these ICT tools. In this context, this study investigates pedagogical problems caused by introduction of ICTs in schools on the FATIH project. Following research questions were investigated within the scope of this study:

- What are the pedagogical problems encountered by teachers in the technology-enhanced learning environment?
- What are the pedagogical problems encountered by students in the technology-enhanced learning environment?

## Method

### Context

This study is carried out in the scope of pilot implementation of FATIH project, which is a nationwide project started during 2012 spring semester. The pilot implementation included 49 secondary and 3 elementary schools in 17 cities representing all regions of Turkey. On the project, tablet computers were distributed to 3 or 4 of the 9th grade classes including teachers for each pilot school, and an interactive whiteboard specifically designed and developed for this project was installed in the classrooms where those students take lessons. Moreover, each pilot school was provided with document cameras and a multi-function printer. As seen in Picture 1 interactive whiteboard has three parts; the electronic part, white board and chalkboard. Electronic part, which was like a large tablet PC, has functions like a computer. A teacher can use the electronic part and the white board simultaneously. To use the chalkboard part, on the other hand, the white part should slide in front of the electronic part.

Figure 1

*Interactive Whiteboard*


Tablet computers have Android operation system and they can be connected to Internet near the electronic board. Students are not allowed to access Internet via tablet PCs at home. They could not use any external storage tools as well. This means there is no transfer of information between electronic board and tablets PCs at the time of investigation. The teachers who teach in pilot classes also took tablet PC with the same properties as the students' tablet PC. Students could take lecture notes and download course materials from Education Informatics Network (EBA) by using the tablet PCs. Thus, while the teacher shows a course material on the electronic board, students could open the same materials on their tablet PC.

In this study, evaluation data were gathered from 4 cities and 8 pilot schools in the Eastern Anatolia Region of Turkey. During the project evaluation, three types of data collection methods were administrated. Firstly, comprehensive questionnaires were administered to understand the perspectives of administrators, teachers, students and parents. Secondly, each school was visited and at least three lectures were observed in a classroom equipped with the technology. Lastly, formal group interviews were conducted with administrators, teachers, students and parents. Because pedagogical problems about learning environment are mostly concerned with teachers, students and school principals, results obtained from parents were not presented in this study.

## Instruments

Pedagogical problems faced by teachers and students were in the scope of this study. The teachers, students and school principals took questionnaire and they were interviewed to determine pedagogical problems related to the project.

The teachers' questionnaire includes 11 questions, students' questionnaire includes 12 questions and school principals' questionnaire includes 6 questions related to possible pedagogical problems the teachers and students are likely to confront during the project. Questions were Likert type with 5 scales.

There were four teams in the project evaluation, which conducted evaluation in different regions of Turkey. Two of the teams developed the questionnaires used in this study. There were five researchers in both teams. Other teams were responsible for reviewing the questionnaires. For the teachers' questionnaire, other 6 experts also reviewed the questionnaire and 2 cognitive interviews were conducted with teachers. After the main implementation, a reliability analysis was conducted for each dimension of questionnaire for teachers and reliability ranges were found between Cronbach's alpha 0.83–0.95.

## Field Formal Group Interviews

Data was collected from unnatural group interviews. They were not natural group interviews because all of the participants know each other, the number of participants in each interview is less then five most of the time, and interviewees rarely talked to each other (Gall & Gall, 2003; Marshall & Rossman, 1999). Researchers investigated more than one field; therefore, each field was considered as an individual entity (Gall, et. al, 2003). Interviews were not conducted individually because a social desirability issue might be faced in this kind of study. In most schools, teachers already felt that they are inquired about their technology use although researchers explained that they are not exposed to evaluation in this study. Thus, teachers might have felt anxious in individual interviews and give dishonest answers. Therefore, group interviews were preferred for the teachers and students.

## Data Collection Procedure

The teachers and school principals were notified about questionnaire implementation process at least two days before. MoNE had already informed schools about evaluation process. Questionnaires were published online and printed

by the researchers in case of any problem with Internet access. The teachers, students and school principals answered the questions at school time. Questionnaire implemented to the teachers, students and school principals as seen in Table 1.

Table 1

*Number of Participants Filled out the Questionnaires*

| ***City*** | ***The number of teachers*** | **The number of students** | **The number of school principals** |
|---|---|---|---|
| Erzurum | 44 | 183 | 8 |
| Rize | 44 | 248 | 11 |
| Erzincan | 33 | 89 | 2 |
| Bingol | 46 | 147 | 10 |
| **Total** | **167** | **667** | **31** |

Interviews were conducted one month after the implementation of questionnaire. On interview day, the teachers, students and school principals were interviewed in schools' meeting rooms. Teachers, students and school principals in 8 pilot schools participated in the study. Teachers and students, who participated in interviews, were using interactive whiteboards and they were distributed tablet computers. As indicated before, only 9th grade high school students were given tablet PCs and interactive whiteboards were established in those classrooms. The research team invited those teachers, students and school principals to the interview; there was no one who did not want to participate in interviews. Interviews took about one hour for each session. At least two researchers took part in interviews. The interviews were taped electronically and transcribed. One interview group of teachers, students and school principals was formed in each pilot school. There were 3-5 teachers, 7-8 students and 1-2 school principals in each interview group. There were both male and female participants in the groups.

## Data Analysis

Firstly quantitative data were analysed. Then interview questions were constructed to reveal the important results of the questionnaire. A descriptive approach was used to show the results and more explanation were given by using interview transcribes. Questionnaire data were analysed with SPSS 20. Transcribed interviews were analysed with Nvivo 7. To provide reliability in interview analyses two researchers constructed the main themes together and then an inter-ratter reliability was conducted. According to Miles & Huberman (1994) reliability analysis, two researchers coded several pages of interview transcriptions separately and reliability score was calculated as 0,85. To resolve conflict two researchers got together and conflicts were removed.

## Results

### Pedagogical Problems Encountered by Teachers

According to Table 2, many participant teachers agree that students' attention on the course decreased due to immense interaction with tablets (38%), classroom management got more difficult due to the students' interest in the tablets (35%) and ICT increased their workload outside the classroom (35%). On the other hand, more than half of the teachers disagree with statements such as; the course content was not applicable for using information technologies, ICT challenges their leadership role in the class, their previous teaching methods and techniques are not satisfactory enough, dependence on interactive board makes difficult to manage classroom and in-class communication and interaction with students decreased.

Table 2

*Pedagogical Problems Encountered by Teachers: Results of the Quantitative Data*

| **Pedagogical problems: Please express your opinion about problems listed below regarding FATİH project.** | **N** | | **Strongly Disagree** | **Disagree** | **Neutral** | **Agree** | **Strongly Agree** | **Mean** | **SD** |
|---|---|---|---|---|---|---|---|---|---|
| Students' attention on the course decreased due to immense interaction with tablets. | 149 | f | 13 | 36 | 31 | 38 | 18 | 3.15 | 1.19 |
| | | % | 9 | 24 | 21 | 26 | 12 | | |
| Classroom management got more difficult due to the students' interest in the tablets. | 148 | f | 12 | 38 | 35 | 34 | 18 | 3.12 | 1.17 |
| | | % | 8 | 26 | 24 | 23 | 12 | | |
| It increased my workload outside the classroom. | 149 | f | 13 | 42 | 32 | 34 | 18 | 3.07 | 1.19 |
| | | % | 9 | 28 | 21 | 23 | 12 | | |
| I can use body language and eye contact less now. | 149 | f | 12 | 43 | 36 | 39 | 8 | 2.99 | 1.08 |
| | | % | 8 | 29 | 24 | 26 | 5 | | |
| In-class communication and interaction with students decreased. | 149 | f | 17 | 61 | 30 | 27 | 8 | 2.68 | 1.10 |
| | | % | 11 | 41 | 20 | 18 | 5 | | |
| The project was not compatible enough with the curriculum. | 147 | f | 15 | 63 | 33 | 18 | 8 | 2.66 | 1.07 |
| | | % | 10 | 43 | 22 | 12 | 5 | | |
| Teaching methods and techniques I used previously were not sufficient. | 148 | f | 20 | 54 | 37 | 23 | 4 | 2.63 | 1.05 |
| | | % | 14 | 36 | 25 | 16 | 3 | | |
| My dependence on the interactive board challenge my classroom management | 145 | f | 18 | 58 | 38 | 21 | 3 | 2.58 | 1.00 |
| | | % | 12 | 40 | 26 | 14 | 2 | | |
| It challenges my leadership role in class. | 149 | f | 28 | 57 | 35 | 18 | 6 | 2.47 | 1.08 |
| | | % | 19 | 38 | 23 | 12 | 4 | | |
| Position of the interactive board affected the seating arrangement negatively. | 149 | f | 26 | 65 | 29 | 12 | 6 | 2.44 | 1.07 |
| | | % | 17 | 44 | 19 | 8 | 4 | | |
| The content of my course was not applicable for using information technologies. | 149 | f | 41 | 65 | 17 | 15 | 7 | 2.22 | 1.17 |
| | | % | 28 | 44 | 11 | 10 | 5 | | |

According to interviews, there were six main problems that teachers encountered. Although it is not a certain aspect of pedagogical problems, most of the teachers mentioned about lack of technical skills. Table 3 shows the themes and frequencies revealed in interviews.

Table 3

*Pedagogical Problems Encountered by Teachers: Results of the Qualitative Data*

| **Codes obtained from analysis** | Groups of Citation | | | | |
|---|---|---|---|---|---|
| | Number of Groups | Number of Citation | Number of Student Groups | Number of Teacher Groups | Number of School Principal Groups |
| To use the technologies lacking of skills was felt | 10 | 21 | 3 | 3 | 4 |
| Workload increased | 8 | 10 | 1 | 4 | 3 |
| Classroom management got more difficult | 8 | 15 | 6 | 1 | 1 |
| Teachers receiving assistance from students | 5 | 7 | 2 | 2 | 1 |
| Teachers' eye contact with the class decreased | 3 | 5 | 1 | 2 | |
| Teachers' motivation decreased | 1 | 1 | | 1 | |

All interview groups state that teachers felt lacking of skills to use the technologies effectively. Some citations supporting this theme are given below in this context:

> *"I know some colleagues are trying to use them and get efficiency at highest extent, but some of them cannot manage it. They use them just as an overhead projector..."* (School principal)

> *"Teachers need training, as I said. We are used to it thanks to the pilot scheme; but others don't have required skills to use technology. There should be a guiding program or smart people. In my opinion, the biggest problem with the board is the lack of that connection in general..."* (Student)

> *"Maybe it is because I am not an expert, but I spend even more time now. Still, I don't know many things..."* (Teacher)

> *"But I need training first. It could be 4 times totalling 1 hour a day. We need a qualified computer teacher rather than a teacher with little knowledge and expertise. They can give courses for 5 or 6 people for a while, not for a crowded group at one time, like 30 ..."* (Teacher)

It is understood from interviews that although it isn't a direct pedagogical problem, mostly it was indicated that with the project workload of the teachers increased. Most of the teachers pointed out that they spend a lot of time outside classroom to learn those technologies in order to be able to use them effectively. They say that they need extra time for preparing materials and good content to use the technology. Other interview groups, too, indicate that teachers' workload increased. A few examples quotes draw attention to the issues are presented below:

*"I said before that we already suffer from heavy workload. We have to cope with regular courses, examination anxiety for students and we are rushing to work. Now there is another task in hand! This time we have to consult others, which is challenging for us. I said yesterday too, I could not keep up with the curriculum in the 9th grade for the first time. It accelerated us. …"* (Teacher)

*"They are even more interested. They are struggling more and solving more problems than before. Also teachers are complaining that we are spoiled by tablets and we do not study hard any longer."* (Student)

*"It is all over Turkey, but it needs much time as every teacher is not able to do that satisfactorily..."* (School principal)

Some of the teachers complain about the fact that they cannot make enough eye contact with students due to using these technologies in the classroom. Students point out the same.

*"We lose eye contact with the teacher…"* (Student)

*"Am I turning too little for eye contact? Is failure because of this? Actually I am turning back to ask if they need clarification. But not as efficient as before..."* (Teacher)

*"Tablets lose eye contact..."* (Teacher)

Another pedagogical problem stated by the interview groups was related to classroom management. It was stated that classroom management gets more difficult as a consequence of the innovations introduced. Interviews groups emphasized that because students use their tablets and teachers focus on using the technologies in class classroom management became harder. Relevant excerpts are as follows:

*"Students sometimes concentrate on irrelevant content in their tablets while teachers are teaching the lesson..."* (School principal)

*"Some friends in the classroom are not listening to the teacher when s/he is teaching the lesson. They are dealing with their tablets. When the teacher tells them off, there is disagreement in the classroom. Then when we ask, our friends just repeat our questions. They do not follow what we say..."* (Student)

*"They are playing games during the lesson. Although the teacher warns them, they continue playing…"* (Student)

*"I have seen many times. While I am teaching the lesson, some students open their tablets without showing me the monitor. I cannot control what they're doing then, so I want to close it..."* (Teacher)

*"I caught my students playing basketball or racing game in tablets three or four times. The teacher is obliged to check them one by one without touching the board, but you cannot do anything on the board then …"* (Teacher)

## Pedagogical Problems Encountered by Students

Table 4

*Pedagogical Problems Encountered by Students: Results of the Quantitative Data*

| | N | | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree | Mean | SD |
|---|---|---|---|---|---|---|---|---|---|
| They face problems while doing homework requiring research. | 626 | f | 113 | 134 | 81 | 101 | 197 | 3.27 | 1.51 |
| | | % | 18 | 21 | 13 | 16 | 31 | | |
| They cannot do their homework on tablets. | 628 | f | 153 | 179 | 107 | 93 | 96 | 3.22 | 1.52 |
| | | % | 24 | 29 | 17 | 15 | 15 | | |
| Lack of eye contact between teacher and students; focus on tablets, and following the lesson with heads down decrease interaction with teacher. | 630 | f | 166 | 192 | 116 | 75 | 81 | 3.02 | 1.38 |
| | | % | 26 | 30 | 18 | 12 | 13 | | |
| Students face difficulty in taking notes during lessons because of using tablets. | 631 | f | 119 | 127 | 122 | 148 | 115 | 2.96 | 1.45 |
| | | % | 19 | 20 | 19 | 23 | 18 | | |
| Students face difficulty in following the lesson because of using tablets. | 625 | f | 133 | 136 | 101 | 128 | 127 | 2.69 | 1.39 |
| | | % | 21 | 22 | 16 | 20 | 20 | | |
| They don't know how they should study on tablets. | 625 | f | 121 | 98 | 81 | 141 | 184 | 2.65 | 1.43 |
| | | % | 19 | 16 | 13 | 23 | 29 | | |
| Attention and concentration on the lesson decrease. | 631 | f | 190 | 155 | 122 | 86 | 78 | 2.46 | 1.32 |
| | | % | 30 | 25 | 19 | 14 | 12 | | |
| Sense of failure increases. | 637 | f | 189 | 179 | 126 | 70 | 73 | 2.38 | 1.29 |
| | | % | 30 | 28 | 20 | 11 | 11 | | |
| Using of tablets and interactive boards in class hinders attending in lesson. | 633 | f | 200 | 179 | 131 | 60 | 63 | 2.28 | 1.24 |
| | | % | 32 | 28 | 21 | 9 | 10 | | |
| Feeling bored due to the slow pace of lesson. | 636 | f | 254 | 218 | 84 | 39 | 41 | 2.25 | 1.30 |
| | | % | 40 | 34 | 13 | 6 | 6 | | |
| Distracted from using technology in lessons. | 633 | f | 210 | 195 | 127 | 46 | 55 | 2.05 | 1.17 |
| | | % | 33 | 31 | 20 | 7 | 9 | | |

As seen in Table 4, majority of the students disagree that information technologies affect learning negatively. More than half of the students disagree on the statements such as concentration and attention on the lesson decreased, sense of failure increased, and attendance in lesson decreased, learning is not permanent and interaction with teachers decreased. It is worth noting that 52 % of the students indicate that they do not know how to use informational technologies for studying.

Qualitative analysis as seen in Table 5 showed eleven main themes related the pedagogical problems encountered by students.

Table 5

*Pedagogical Problems Encountered by Students: Results of the Qualitative Data*

| | Groups of Citation | | | | |
|---|---|---|---|---|---|
| **Codes obtained from analysis** | Number of Groups | Number of Citation | Number of Student Groups | Number of Teacher Groups | Number of School Principal Groups |
| Attention on the lesson is distracted. | 12 | 28 | 8 | 2 | 2 |
| Students spend their time outside class with these technologies. | 11 | 18 | 4 | 5 | 2 |
| Student became passive. | 6 | 17 | 5 | | 1 |
| Students play games on tablets. | 7 | 19 | 3 | 2 | 2 |
| Academic achievement decreased. | 6 | 11 | 3 | 3 | |
| Students' hands are getting lazier. | 4 | 6 | | 4 | |
| Students are not listening to the lesson. | 2 | 4 | 1 | 1 | |
| We cannot take notes because teachers teach the lesson at a fast pace. | 3 | 3 | 3 | | |
| Interaction among students decreased. | 2 | 3 | 2 | | |
| Lasting learning is not achieved. | 1 | 1 | | 1 | |
| It affected our imagination negatively. | 1 | 1 | 1 | | |

The results demonstrate that all of the interview groups complain about the fact that students become distracted during lessons as a result of the innovations introduced.

> *"Some friends in the classroom are not listening to the teacher when she/he is teaching the lesson. They are dealing with their tablets. When the teacher warns them, tension happens in the classroom. Then when we ask, our friends just repeat our questions. They do not follow what we say…."* (Student).

> *"I caught my students playing basketball or racing game in tablets three or four times. The teacher is obliged to check them one by one without touching the board, but you cannot do anything on the board then …"* (Teacher)

> *"Students sometimes concentrate on irrelevant content in their tablets while teachers are teaching the lesson..."* (School principal)

> *"They might go into games secretly during the lesson only if they can manage. They can do it outside the lesson and stay distracted from the lesson..."* (Trainer Teacher)

All of the interview groups also point out that the innovations brought by the F@TİH project have a negative influence on students. They complain that students spend most of their free time engaged in technology, they even do not go out during break time and they are mostly busy with the interactive whiteboard or tablets. These complaints are also evident in the quote provided below:

*"I haven't seen any changes. There were crowds of students in the school yard before. But nobody goes out after the tablets. Everybody is playing games on their tablets…"* (Students).

*"For example I do not see any students going out during break hours any longer…"* (Teacher)

*"The students were playing a video clip on the interactive whiteboard. Of course we are not against it but they are at school and they shouldn't do it in class...."* (School principal)

*"You know, they are more knowledgeable than us. Once I found in a class that students opened music files all over the board. Imagine!..."* (Trainer Teacher)

Another pedagogical problem of the technologies on students is that the technologies turn students into passive learners. Sample excerpts related to these complaints are as the follows:

*"Yes, we cannot take notes either because we do not listen to the lesson. Success level decreases in this case because it is more lasting when you take notes…"* (Student)

*"Students prefer one-by-one interaction with the teacher. In the past, it used to be a surprise when the teacher draws a question on the board. But it is not a surprise for students anymore! They can look and see the question all of a sudden. Their mind is almost blocked. The magic disappeared. Students are not curious about what the teacher draws on the question. They are in a hard situation now because creative thinking way and curiosity was lost, …"* (Teacher)

*"We need to note that there is a traditional education understanding. You read and take notes or underline, etc. At what extent did children use to have those habits? At what extent did they lose them? In what way are they affected from them? ...."* (School principal)

## Discussion and Conclusions

This study investigates pedagogical problems that were encountered by students and teachers upon launching of the nation-wide technology integration project. Both qualitative and quantitative findings show that teachers felt that they do not have enough ability to use the technologies effectively, they have difficulty in classroom management, they lost their leader role in the class, and they lost their communication and interaction ability with their students.

Students disagreed with teachers on that technology has negative effects on their academic achievement, technology does not provide permanent learning, it restricts student-to-student interaction and communication and that it restricts their imagination. However, according to the qualitative data, it was found that these technologies cause many pedagogical challenges such as new classroom

technologies' distracting students' attention, leading students' spending most of their time with them, causing students to become passive learners and use these technologies for gaming only.

Teachers believe that as learning becomes individualized, it is disturbed by the implementation of the project. The underlying idea is that students pay much attention to these new technologies and disconnect from the learning context. Results of several studies support that using mobile devices in classroom causes distraction in learning (Kraushaar & David, 2010; Sana, Tina, & Nicholas, 2013; Wood, Zivcakova, Gentile, Archer, De Pasquale, & Nosko, 2012). According to the "attention theory", quality and quantity of the information processed is affected from the degree of attention towards the task (Sana, Tina, & Nicholas, 2013). Since tablet computers have not been used effectively but they also carry many different activities that attract students' attention, students' learning might have been influenced negatively as teachers stated.

In most of the cases, time to learn new technologies causes some problems in technology integration (Butler & Sellbom, 2002). In this study, teachers have not stated such a problem but they complained about lack of knowledge to integrate them into their teaching, similar to the results found in literature (Ghavifekr, Kunjappan, Ramasamy, and Anthony, 2016 & Gil-Flores, Rodríguez-Santero, & Torres-Gordillo, 2017). In fact, the new technologies mentioned are not so different from the technologies that they used before. Interactive whiteboards were like a large tablet computer, which has a Pardus or Windows operating system, thus teachers using computers, has no problem with using them. This situation made teachers keep using the new technologies that are similar to the one they often used in the past (Butler & Sellbom, 2002). Thus, teachers did not have difficulty in using them in teaching as long as they found beneficial resources to show on interactive whiteboards. In fact the difficulty for the teachers was that to prepare course materials to be used on interactive whiteboard not to use technologies in technical meaning.

Teachers' belief about the benefits of innovations has a significant effect on their decisions to use educational technologies (Mumtaz, 2000; Ertmer, 2005; Ottenbreit-Leftwich, Glazewski, Newby, & Ertmer, 2010). In parallel with this belief, in this study, teachers have not reported a significant problem with using interactive whiteboards since they have used them at least to show presentation slides. However, they expressed many negative issues related with tablet computers. As Ottenbreit-Leftwich et al (2010) stated, if teachers observe a positive relationship between technology and learning engagement of students, their value beliefs associated with their students increase. However, present study revealed that since there are not enough course resources integrating interactive whiteboard and tablet PCs, they were not used effectively and they cause distraction on students' attention in the class. Therefore, to avoid students' using tablet PCs for out-class tasks, some technical solutions might be developed like locking tablet PCs during the class. Also more interactive programs should be developed to provide interactive whiteboard – tablet PC integration. Contrary to teachers, students stated very few pedagogical problems related with tablet computers. One reason might be that they were not aware of how

technology can be used effectively for pedagogical purposes. Another reason might be that students have already used tablet PC's for different purposes and they were pleased with doing so.

This study is conducted in the eastern part of Turkey. Students in that region have lower socioeconomic status comparing with the other regions. Therefore, this project has more value for them in terms of meeting new technologies for the first time. Therefore, students' reactions towards new technologies might be called as novice effect. Many technical problems were reported by teachers since the project is in its first year for both interactive whiteboards and tablet PC's. This might influence the perspectives of teachers. These two issues might be assumed as limitations in this study. In the first implementation, there are not many resources and course materials available in interactive whiteboards and tablet PCs. However, these materials have been developed for each course and tablet PC's might be used effectively after new resources and materials are added.

In accordance with the results, researchers recommend that the extent at which technical problems cause pedagogical problems should be investigated. To do this, time series measurement should be taken since technical problems are solved gradually. Similarly, after the establishment of new resources and course materials, new measurements should be taken. Effective use should not be associated only with the technology itself. Teachers' beliefs and other external factors should be investigated too.

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# An Analysis of YouTube Videos about Teachers

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## Abstract

The way people perceive teachers is closely linked to the way teachers are represented through interactions that take place in-person, as well as interactions that take place online. Even though teachers' use of YouTube videos as part of instruction has been examined in literature, there is no research regarding how teachers are represented on YouTube. The aim of this study is to evaluate YouTube videos concerning teachers in terms of how teachers are portrayed. By adapting a similar methodology to Rittberg, Dissanayake, and Katz (2015), the keyword "teacher" is searched on the YouTube search engine (www.youtube.com) and the first 60 videos (3 pages) were analyzed. The list of the videos and the basic information of each video (such as the video name, URL, search rank, date uploaded, total viewership, likes, and dislikes) was recorded. Each video's content, cover image, and title were independently coded by two reviewers as either negative, neutral, or positive in relation to the following question: "In what manner is the teacher (or the concept of teacher) portrayed in this video?" The results of this study clearly show that most of the videos examined portray the teacher in a negative manner. Furthermore, among the videos that portrayed the teachers negatively, a considerable amount represented teachers in a sexual manner. The results were discussed in light of the theory of Internet Information Gatekeepers (Laidlaw, 2010) and the theory of social construction of reality (Berger & Luckmann, 1991). Based on the findings of this study, following suggestion was made; Teacher education departments in the higher education institutions should pay close attention to prepare future teachers effectively so that the teachers are equipped with the knowledge to address adverse teacher image abundant on the Internet. Such programs should also emphasize the critical thinking, as it is pivotal in establishing media literacy.

***Keywords:*** perception of teachers, YouTube, the Theory of Internet Information Gatekeepers, the Theory of Social Construction of Reality

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# Öğretmenlerle İlgili YouTube Videolarının Analizi

## Öz

İnsanların öğretmenleri nasıl algıladıkları, onların birebir, yüz yüze etkileşimlerinin yanı sıra internetteki etkileşimleri ile de ilişkilidir. Literatürde öğretmenlerin verdikleri eğitimin bir parçası olarak YouTube'u kullanmaları incelenmiş olmasına rağmen, öğretmenlerin YouTube'ta nasıl temsil edildiklerine yönelik bir çalışma bulunmamaktadır. Bu çalışmanın amacı, öğretmenlerle ilgili YouTube videolarında öğretmenlerin nasıl sunulduğunu incelemektir. Rittberg, Dissanayake ve Katz'ın 2015 yılında yayımlanan çalışmasının metoduna benzer bir metod kullanılarak, YouTube (www.youtube.com) arama motoruna "öğretmen" kelimesi yazılarak elde edilen ilk üç sonuç sayfasındaki 60 video incelenmiştir. Arama sonucunda elde edilen videolarla ilgili şu bilgiler kaydedilmiştir: video adı, URL, arama sıralaması, videonun yüklenme tarihi, izlenim sayısı, beğenilme ve beğenilmeme sayısı. Videoların her biri "Bu videoda öğretmen ya da öğretmen kavramı nasıl sunulmuş? (olumsuz, tarafsız ya da olumlu) sorusu bağlamında iki bağımsız kodlayıcı tarafından kodlanmıştır. Sonuçlar incelenen videoların çoğunda öğretmenlerin olumsuz bir şekilde sunulduğunu açıkça ortaya koymuştur. Hatta, öğretmenleri olumsuz bir şekilde sunan videoların önemli bir kısmının öğretmenleri müstehcen sunduğu tespit edilmiştir. Elde edilen sonuçlar İnternet Bilgi Eşik Bekçileri teorisi (Laidlaw, 2010) ve Gerçekliğin Sosyal İnşası teorisi (Berger & Luckmann, 1991) ışığında tartışılmıştır. Çalışmanın sonuçlarına bağlı olarak şu tavsiyede bulunulmuştur: Yüksek eğitim kurumlarındaki öğretmen eğitimi programları gelecek nesil öğretmenleri yetiştirirken internette bolca rastlanan olumsuz öğretmen imajına yönelik hazırlıklı olmaya özen göstermelidirler. Ayrıca bu programlar medya okuryazarlığının oluşturulmasında çok önemli bir yere sahip olan eleştirel düşünceye ağırlık vermelidir.

***Anahtar Sözcükler:*** öğretmen algısı, YouTube, İnternet Bilgi Eşik Bekçileri teorisi, Gerçekliğin Sosyal İnşası teorisi

## Introduction

The invention of the World Wide Web has drastically impacted the way we live. It affects all domains of human life, including education and the teaching profession. One of the most prevalent media sources used in schools today is YouTube. YouTube is a video-sharing platform which hosts free video content uploaded by users across the globe. Currently, YouTube has over a billion users. These videos posted on the YouTube website generate billions of views every single day. YouTube has become so extensively popular that it now reaches more 18-34 and 18-49 year-olds compared to any cable channel in the U.S. (YouTube, 2016). As the largest and most popular video sharing website in the world, YouTube houses many different forms of videos ranging from professionally-made, to amateur. The videos on this site makeup a very diverse mixture of subject matter spanning from educational content to content intended for entertainment purposes. Because modern education is encouraged to be innovative (see Snyder & Burke, 2008), the use of YouTube is perceived as an innovative practice that keeps students' attention alive while also making the learning experience indelible (Clifton & Mann, 2011).

The use of YouTube videos both in and out of the classroom has many benefits, such as making instruction more engaging and reducing the time spent in class for instruction. One of the reasons for the popularity of YouTube videos for educational purposes is that such videos are in alignment with the domains of Bloom's taxonomy, as stated by May, Wedgeworth, and Bigham (2013). Bloom's taxonomy can be examined in three main domains: cognitive, affective, and psychomotor. The educational videos address the cognitive domain through the application of the specific knowledge covered by the videos. Along with the introduction of the content, videos enable students to raise questions about the values or the behaviors represented in the content through the evaluative examination of the content. Thus, they address the affective domain of Bloom's taxonomy. This could be apparent when students' state that they remember the video itself because of the way it made them feel, while not remembering the specific course content. YouTube videos could also be used to show how particular psychomotor activity is executed (May, Wedgeworth, & Bigham, 2013). By addressing the three main domains of Bloom's taxonomy, YouTube videos can hold significant educational value.

## Theoretical Framework

The theoretical framework for this current research study was based on the theory of social construction of reality (Berger & Luckmann, 1991), and the theory of Internet Information Gatekeepers (Laidlaw, 2010).

Despite its popularity in the general public and teaching profession, the way the website ranks videos is a mystery, as there is no official explanation for how YouTube ranks the videos. Is it the number of views, keyword relevance, video rating, or a combination of these factors? The nature of the algorithm (or any other calculation on the decision used to rank any given video) is not clear for the outside users. Because of this vague and classified element, the YouTube website acts like an

Internet gatekeeper with secrecy. According to Internet Information Gatekeepers theory, by controlling the flow of information, the discussion and involvement in societies are shaped and controlled by the Internet gatekeepers. While some information is selected for distribution, other is eliminated. By doing so, the Internet gatekeepers could have the role of facilitating discussions on social issues, which can then shape the perception of others as they decide what is to be distributed (selection) and what is not to be distributed (inhabitation) (Laidlaw, 2010). Namely, by the control of the flow of information, the Internet gatekeepers take role in shaping the democratic discourse (Laidlaw, 2010). According to Laidlaw (2010), such gatekeepers have two main roles: "one outward-looking shaping behaviour or perceptions and the other inward-looking by inhibiting behaviour or access. Recognising such dual purposes transfers well to the Internet environment, where gatekeepers have the capacity to act both as facilitators of and impediments to democratic discourse" (Laidlaw, 2010, p. 265).

The perception of any group in any given society is closely linked with how this particular group is represented in the media. Any social concept is not shaped in isolation, but through social interactions. How people perceive teachers is closely linked to the way teachers are represented through interactions that take place in-person, as well as interactions that take place online. In this study, another theory could be useful to shape the framework of this research and help us better understand the process of shaping a social concept: The theory of social construction of reality (Berger & Luckmann, 1991). According to this theory, individuals generate reality based on past collective interactions. In this current research study, such interactions refer to virtual interactions – videos of interactions involving educators. The way individuals perceive teachers in our society is closely linked to the way those individuals treat teachers. Therefore, perception of any social group is a very important factor, as perceptions will often feed the potential actions. Considering the term "teacher", as a concept shaped by virtual social interactions, the magnitude of the responsibility of Internet platforms such as YouTube becomes more apparent.

Even though teachers' use of YouTube videos as part of instruction has been examined in literature (i.e., O'Connor, 2010; Tamim, 2013), there is no research regarding how teachers are represented on YouTube. It would be interesting to see how the teachers themselves, as one of the main users of YouTube, are portrayed on YouTube. Therefore, researching and analyzing the way teachers are portrayed on videos hosted by YouTube becomes critically important. If the students were asked by teachers to search on YouTube for information, what would they find about teachers on YouTube? Could the findings have an impact on the learning based on the way the videos shape the concept of teachers and their role in relation to students?

The current content analysis examines the coverage of teachers on YouTube. The objectives of this study are to provide a qualitative analysis of videos on teachers and to discuss the significance of fairly representing teachers on online platforms such as YouTube.

## Method

By adapting a similar methodology to Rittberg, Dissanayake and Katz (2015), the keyword "teacher" is searched on the YouTube search engine (www.youtube.com) and the first 60 videos (3 pages) were analyzed separately by the author and a second coder. The list of the videos and the basic information of each video (such as the video name, URL, search rank, date uploaded, total viewership, likes, and dislikes) was recorded between 8:00 AM-10:00 EST on Monday, November 30, 2015. Using the search term "teacher", the first 60 videos on YouTube were analyzed. Each video's content, cover image, and title were independently coded by two reviewers as either negative, neutral, or positive in relation to the following question: "In what manner is the teacher (or the concept of teacher) portrayed in this video?" In the case of a discrepancy between raters, a third rater evaluated the video. Only English or partially English videos were reviewed.

## Results

Using the search term "teacher" in the search engine resulted in about 8,780,000 videos. The first 60 videos (3 pages) on YouTube were analyzed. Initial analysis showed that one video was repeated in the search result; therefore, the repeated video was excluded from the analysis, resulting in 59 videos to be analyzed. These videos were analyzed separately in terms of content, title, and the cover image of each video by the author and a second coder. The initial inter-rater reliability between the coders was determined by computing Cohen's kappa coefficient (Cohen, 1960), for three categories; the content, the cover image, and the title of the videos. While percentage agreement does not disregard potential chance agreement, kappa makes adjustments for the potential agreement between raters that could occur by chance (Yoder & Symons, 2010). Cohen's kappa between the coders was found to be 0.90 for the content of the videos, 0.86 for the video cover images, and 0.97 for the title of the videos. After discussing the initial results, a complete agreement was reached between the raters, and therefore, the result of re-computation of Cohen's kappa was 1.

In terms of the content of the videos, 66.1% percent of the videos were coded as negative, 16.9% neural and 16.9% positive. As for the cover image of the videos, 52.5% of the videos were coded as negative, 35.6% neutral, and 11.9% positive. The results also showed that 57.6% of the titles of the videos were coded as negative, 30.5% neutral, and 11.9% positive (see Figure 1 and Figure 2).

Figure1

*Nature of the Ezamined YouTube Videos on Teachers in terms of their Content, Comer Image, and Title*

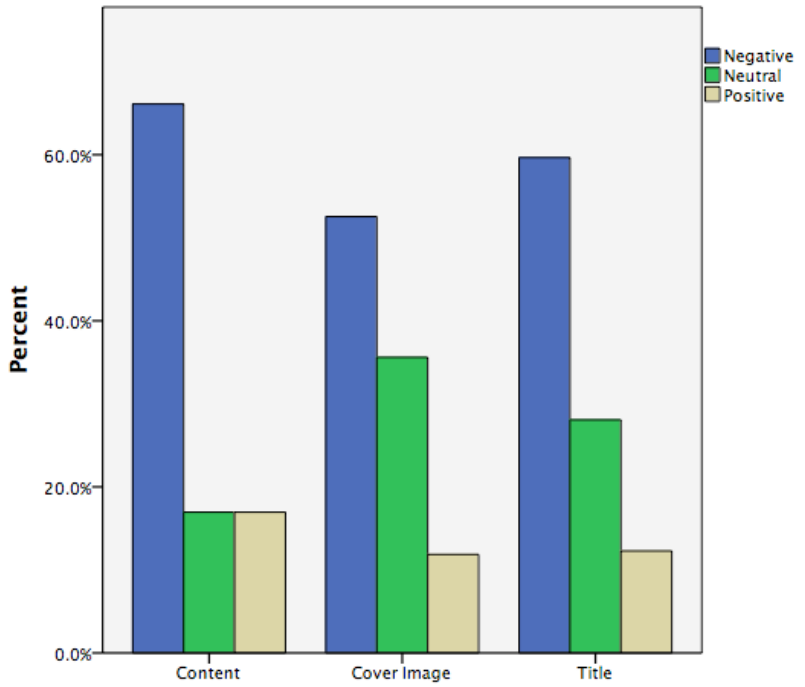
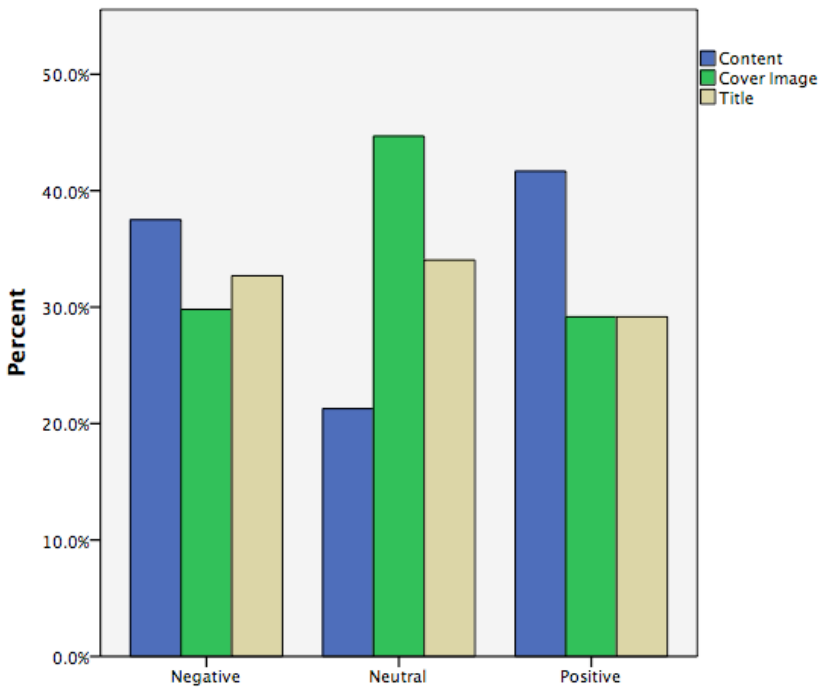



Figure 2

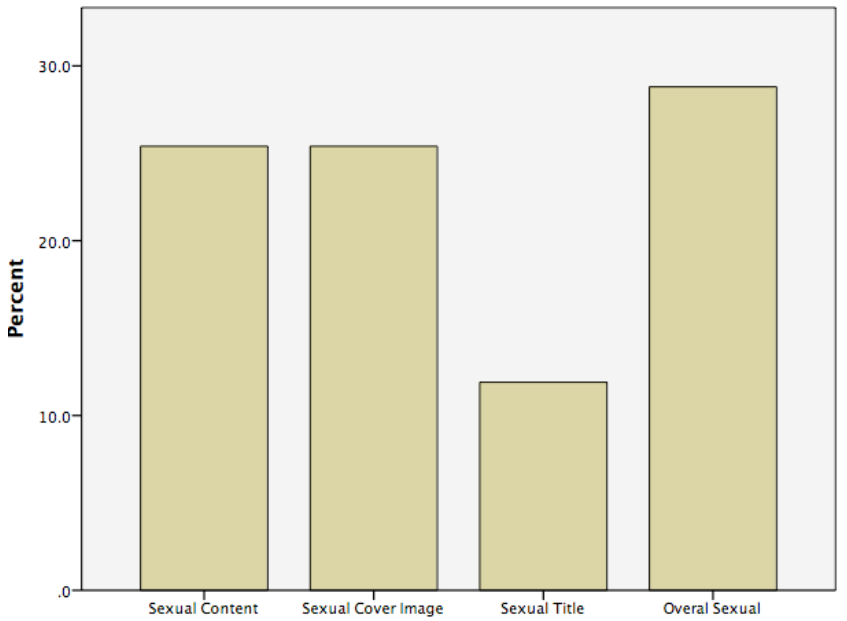
*Breakdown of the YouTube videos on Teachers and their Coding*



Twenty-five percent of the video content, 11.9% of the video titles (such as "Porn teacher," "Sexing teacher 'asked me to send naked pics'"), and 25.4% of the cover image of the videos contained sexuality. Altogether, 28.8% of the videos had sexuality in their content, title, and/or their cover image (see Figure 3).

Figure 3

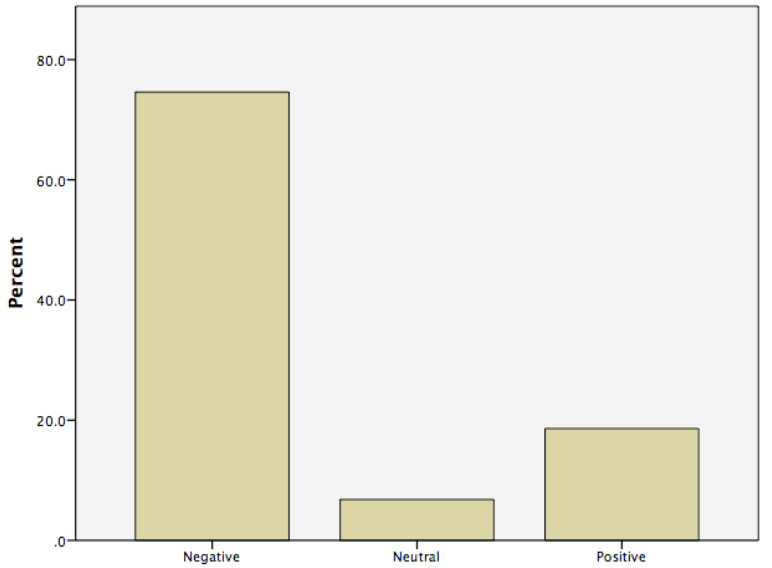
*Sexuality elements of the examined YouTube videos on Teachers*




Overall, 74.6% of the videos were coded as negative, 6.8% neutral, and 18.6% positive in terms of content, title, or cover image of the videos. In the overall coding process for each individual video, a video was automatically coded negative if it was coded negative in at least one of the three categories (content, image, or title). If the videos were coded as neutral, it meant that the videos were coded as neutral in all three of the categories. The videos were coded as positive if all three categories of the video were coded positive, or if there was any positive and neutral combination with no negative coding (see Figure 4).

Figure 4

*Overall Nature of the Examined YouTube videos on Teachers*




Among the top 10 most liked videos, 9 were overall negative, 1 was overall positive, and 3 were also overall sexual. In terms of the top 10 most-viewed videos, 8 were overall negative, 2 were positive, and 7 of them were also overall sexual.

## Discussion

The results of this study clearly show that most of the videos examined portray the teacher in a negative manner. Furthermore, among the videos that portrayed the teachers negatively, a considerable amount represented teachers in a sexual manner. The teaching profession continues to be faced with such negativity in today's society. Adding more negativity to the profession by portraying teachers on YouTube negatively makes the issue even more problematic.

I argue that YouTube's practices fit well with the framework laid out by the theory of Internet Information Gatekeepers (Laidlaw, 2010). First, I would like to address the issue of controlling the flow of information. YouTube has a larger audience and is freely available to any individual with access to the Internet. Therefore, YouTube has the potential to have a large influence on public discourse. YouTube controls the flow of information by selecting what information to make public. In this case, control is exercised by selecting which videos to show up in the search result and on what rank they will appear, and eliminating (removing the video) or reducing the chance of some of the other videos (pushing the rank of the video down). Online platforms like YouTube are both facilitators and inhibitors of democratic discourse. The concept of democratic discourse is rooted in the idea that diverse opinions (in this case, videos with diverse opinions) should have a fair chance of coverage on the democratic platforms (in this case, YouTube). By

providing a fair coverage of teachers, online platforms such as YouTube can facilitate current democratic discussions about teachers. Similarly, if the videos that portray teachers in a positive or non-negative manner appear at the very low rank in the search results due to the complex and vague calculations and/or other factors determining the ranking formula, such video sharing sites may inhibit the democratic discussions.

Via elimination of certain videos approaching the concept of teacher in a way that is not sensational, the Internet video platforms play a significant role in shaping people's perception of the social concepts such as teachers.

I also argue that practices employed by YouTube fit well with the theory of social construction of reality (Berger & Luckmann, 1991). By eliminating (or lowering the possibility of the being watch) certain videos, thus funneling the viewers to videos that are biased or simply distort or exaggerate the reality about teachers, YouTube takes part in the process of shaping the reality of teachers in our society. Namely, YouTube plays a significant role in the shaping of what people think of teachers, thus, the social construction of the concept of teachers.

If a naïve person, as in someone knowing nothing about the teaching profession or teachers, were to conduct a search on teachers, the videos he or she would discover would be very disturbing in terms of the nature and role of educators. This person would be inclined to think that what goes on in schools is largely a sexual matter, and that teachers are sexual predators.

The values of any society are vulnerable if they are not protected. Putting pressure on social media about representing teachers in a fair way is an action taken towards the protection of society's values. If no action is taken, the teaching profession, as noble as it is, faces a real threat of being represented as a profession tainted with sexuality and negativity in the eyes of the society.

As much as it is pivotal to apply pressure to social media outlets about the fair representation of teachers, it is equally important to educate the public (especially the students) on critical literacy. Removing all of the misrepresentations from the Internet is not viable, thus, promoting critical literacy skills is pivotal. Such promotion of critical thinking focusing specifically on the Internet should be executed by providing concrete examples so that the awareness on the biased practices employed by the social media outlets could be increased. Teacher education departments in the higher education institutions should pay close attention to prepare future teachers effectively so that the teachers are equipped with the knowledge to address adverse teacher image abundant on the Internet.

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# Mediation Role of Self-Efficacy Perceptions in the Relationship between Emotional Intelligence Levels and Social Entrepreneurship Traits of Pre-Service Teachers

**Hüseyin Akar*** **Mehmet Üstüner****

## Abstract

The purpose of this research is to examine the motivator role of self-efficacy in relationship between pre-service teachers' emotional intelligence levels and social entrepreneurship characteristics. Relational model was used in this study. The participants of the research are 360 pre-service teachers in different programs from Kilis 7 Aralık University Muallim Rifat Faculty of Education. To collect data, "social entrepreneurship scale of pre-service teachers," "Self-efficacy scale" and "emotional intelligence scale" were used. To analyze data, descriptive statistics, correlation analysis and the bootstrap method was used to determine motivator effect. As a result of analysis of the research data, statistically significant relationships with positive correlation were found between self-efficacy, emotional intelligence of pre-service teachers, and social entrepreneurial characteristics. In addition, self-efficacy perception was found to be a partial moderator role between social entrepreneurship characteristics and emotional intelligence level of pre-service teachers. Pre-service teachers understand their own and others' feelings and have the ability to manage. Thus, self-efficacy perceptions are influenced in a positive way, they trust more to their own knowledge, skills and abilities when it comes to a specific task. Therefore, the development of some entrepreneurial characteristics are positively affected towards a social problem to be solved voluntarily. Also emotional intelligence level of pre-service teachers and self-efficacy together explain 62% of the total variance of the characteristics of social entrepreneurship. In this context, in training teachers who are sensitive to social problems, and in an attempt to get sustainable innovative solutions, thereby creating social value, perceptions of self-efficacy and emotional intelligence are to important variables. Community service applications and rich experiences in social responsibility projects to improve emotional intelligence and self-efficacy perception of pre-service teacher are needed.

***Keywords:*** Self-efficacy, emotional intelligence, social entrepreneurship, pre-service teacher

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# Öğretmen Adaylarının Duygusal Zekâ ve Sosyal Girişimcilik Özellikleri Arasındaki İlişkide Öz Yeterlik Algılarının Aracılık Rolü

## Öz

Bu araştırmanın amacı, öğretmen adaylarının duygusal zekâ düzeyi ile sosyal girişimcilik özellikleri arasındaki ilişkide öz yeterlik algılarının aracılık rolünü incelemektir. Araştırmada ilişkisel tarama modeli kullanılmıştır. Araştırmanın katılımcılarını Kilis 7 Aralık Üniversitesi Muallim Rıfat Eğitim Fakültesi'ndeki farklı programlarda öğrenim gören 360 öğretmen adayı oluşturmaktadır. Araştırma verilerinin toplanmasında "Öğretmen adaylarının sosyal girişimcilik ölçeği", "Öz yeterlik ölçeği" ve "Duygusal zekâ ölçeği" kullanılmıştır. Araştırma verilerinin analizinde betimsel istatistikler, korelasyon analizi ve aracılık etkisini belirmek amacıyla bootstrap yöntemi kullanılmıştır. Araştırma verilerinin analizi sonucunda; öğretmen adaylarının duygusal zekâ düzeyi, öz yeterlik algısı ve sosyal girişimcilik özellikleri arasında pozitif yönde anlamlı ilişkiler olduğu görülmüştür. Ayrıca öğretmen adaylarının duygusal zekâ düzeyi ile sosyal girişimcilik özellikleri arasındaki ilişkide öz yeterlik algısının kısmi aracılık rolüne sahip olduğu sonucu elde edilmiştir. Öğretmen adaylarının kendisinin ve başkalarının duygularını anlama ve yönetme becerisine sahip olması; öz yeterlik algılarını olumlu yönde etkilemekte, öğretmen adayı belirli bir işi yapabilme konusunda kendi bilgi, beceri ve yeteneklerine daha fazla güvenmekte, bu da öğretmen adaylarının herhangi bir karşılık beklemeden toplumsal problemleri çözmeye yönelik kendisini harekete geçiren bazı girişimci özelliklerinin gelişimine olumlu katkı sağlamaktadır. Araştırmada son olarak öğretmen adaylarının duygusal zekâ düzeyi ile öz yeterlik algıları birlikte sosyal girişimcilik özelliklerine ait toplam varyansın % 62'sini açıkladığı görülmüştür. Bu kapsamda toplumsal problemlere duyarlı, bu problemlere sürdürülebilir yenilikçi çözümler bulabilme gayret ve çabası içinde olan, böylece sosyal değer yaratabilen öğretmenlerin yetiştirilmesinde duygusal zekâ ve öz yeterlik algısının önemli iki değişken olduğu söylenebilir. Öğretmen adaylarının duygusal zekâ ve öz yeterlik algılarını dolayısıyla sosyal girişimcilik özelliklerini geliştirmek için topluma hizmet uygulamaları ve toplumsal sorumluluk projesi gibi derslerde zengin yaşantılar geçirmeleri sağlanmalıdır.

***Anahtar Sözcükler:*** öz yeterlik, duygusal zekâ, sosyal girişimcilik, öğretmen adayı

## Introduction

Educational institutions are organizations that possess contemporary qualities (Argon & Selvi, 2013), are competent in economic, social, cultural and even political matters (Najafi, Ghahfarokhi, Shafiei & Afsouran, 2014), learn to learn, creative, and innovative (Numanoglu, 1999;Çalık & Sezgin, 2005), in other words, that aim to train entrepreneurial individuals (Akar & Aydın, 2015).

The concept of entrepreneurship is derived from the word "Entreprendre", a French word that means to embark, to commence, to undertake (Ahmadpor Dariani, 2005). Mill (1848) stated that entrepreneurship is composed of different components such as management, supervision, control and risk taking. Duren and Niemen (2005) defined entrepreneurship as the ability to demonstrate a higher performance in the production process and produce innovations, but also focused on risk taking and awareness about the opportunities available in the environment as essential skills that an entrepreneur must possess. Drucker (1985) argued that there was a mutual relationship between creativity, innovation and entrepreneurship. Drucker proposed that there could be no entrepreneurship without creativity and innovation. In a study conducted with entrepreneurs by Jeff (1989), it was concluded that the primary objective of entrepreneurs is to innovate, while the secondary objective is to achieve economic benefits. According to Hisrich, Langan-Fox and Grant (2007), entrepreneurship is an important factor for employment, economic growth, innovation, improvement of product and service quality and competition. According to Kim, Aldrich and Keister (2003), entrepreneurial activity has a vital role in the economic growth and development of a nation. According to Bednarzik (2000), entrepreneurship promotes innovation, new businesses and global competition on a national and institutional basis. Aldrich (1999) emphasized that entrepreneurship has a significant role in the development of the economy and sustenance of institutions.

Entrepreneurship is not only considered an economic, but also a social activity. This perspective has resulted in the emergence of the social entrepreneurship approach. Social entrepreneurship, which at its core contains socialness and entrepreneurship, involves solving the social problems with an entrepreneurial approach in its simplest form (Güler, 2008). Concepts of social entrepreneurship and social entrepreneur were defined by different authors in different ways (Dees, 1998). Dees (1998) defined social entrepreneurs as those with social objectives. According to Thake and Zadek (1997), social entrepreneurs act with the desire to establish social justice. According to Reis (1999), social entrepreneurs create social values by using financial resources with an innovative approach to ensure social, economic and societal development. According to Drayton (2002), social entrepreneurs are significant agents of change that are focused on identifying, addressing and resolving social problems. According to Alford, Brown and Letts (2004), social entrepreneurs generate innovative solutions for existing social problems and mobilize ideas, talents, resources and social regulations necessary for social transformation. According to Miller, Grimes, McMullen and Vogus (2012), social entrepreneurs put forward innovative business models that address social problems and complex social needs. Based on the above mentioned definitions and as Aileen Boluk and Mattiar (2014)

mentioned, it could be argued that social entrepreneurs focus on solving social problems in the society and providing for the social needs instead of achieving commercial income. According to Martin and Osberg (2007), the most important difference between conventional entrepreneurs and social entrepreneurs is the fact that while entrepreneurs are motivated by money, social entrepreneurs are motivated by altruism (thinking about others) and benevolence (p. 34). Therefore, social entrepreneurship processes are different from the processes in conventional entrepreneurship in terms of objective and motivation, although these processes are similar to those of traditional or commercial entrepreneurships. Interest in social motivators has become a main precondition for all social entrepreneurship studies. Furthermore, it was considered a decisive feature of social entrepreneurship. Entrepreneurs and social entrepreneurs are generally separated based on whether they are motivated by profit (Aileen et al., 2014). Social entrepreneurs need to generate financial profits as well in order to continue their mission although their primary aim is to find permanent solutions for social problems and to create social values. For the social entrepreneur, economic value does not represent the ultimate goal, but it must be taken seriously as it is an important aspect that ensures the sustainability of innovation, initiatives and financing (Mair & Marti 2005, p. 39). Thus, Whitman (2011) emphasized that social entrepreneurs create and implement applicable economic models to achieve their social and environmental goals.

Social entrepreneurs emerge in situations where the public or private sector is unable to fulfill the current needs in areas such as education, welfare, environment and health sufficiently. They diverge from conventional entrepreneurs by pursuing a social mission and focusing on social needs (Austin, Stevenson & Wei-Skillern, 2006), and endeavor to maximize their social impact to achieve their social objectives (Sherman, 2006). They consider that they could only improve the well-being of the inadequate, neglected and over-disadvantaged population to the highest level by this method (Martin & Osberg, 2007, p. 35).

When the characteristics of social entrepreneur teachers are considered, it could be observed that they possess qualities such as self-motivation, determination, ambition, charisma, leadership, risk taking, communicating their vision, inspiration, high level use of resources (Shaw & Carter, 2007, p. 422), extroversion and being open to experiences (Akar & Aydin, 2015). Empathy and high motivation levels are necessary traits for a social entrepreneur (Pearce, 2003). These traits considerably refer to emotional intelligence and self-efficacy perception.

Emotional intelligence refers to cognitive processes involved in recognizing, understanding, and managing the emotions of the self and other people in order to solve the problems the individual faces and to regulate her / his behavior (Mayer & Salovey, 1997). According to Goleman (1995), emotional intelligence includes innate and acquired abilities, skills and potentials. In various studies, emotional intelligence has been demonstrated to have significant effects on individual and organizational variables such as psychological well-being, establishing high quality social relationships and success in career, problem recognition and solving, job

satisfaction, job participation, job performance and job loyalty (Schutte , Malouff, Thorsteinsson, Bhullar & Rooke, 2007; Mayer, Roberts & Barsade, 2008; Lopes, Brackett, Nezlek, Schütz, Sellin & Salovey 2004; Romannelli, Cains & Smith, 2006; O'Boyle, Humphrey, Pollack & Story, 2011; Carmeli, 2003; Zampetakis, Kafetsios, Bouranta, Dewett & Moustakis, 2009; Ashkanasy & Daus, 2005; Cherniss, 2010).

Based on previous studies, emotional intelligence has an important impact on the entrepreneur behavior. Entrepreneurs with a high level of emotional intelligence are more resilient to environmental oppression, better understand their negative emotions, and can regulate their emotions to reduce stress. This fact increases the entrepreneurial behavior. Entrepreneurs with high emotional intelligence can demonstrate high-level creative behavior (Kamalian & Fazel, 2011; Nikolaou & Tsaousis, 2005). Positive emotions were observed to encourage cognitive flexibility and creativity in studies conducted on new ideas and recognition of opportunities (Staw, Sutton & Pelled, 1994). According to George and Zhou (2007), positive emotions enable individuals to be more creative, and to come up with more ideas. In a study conducted by Forgas (1989), it was determined that positive emotions developed problem solving skills in the decision making process. Weitzel, Urbig, Desai, Sanders and Acs (2010) reported that creativity reduced egoistic desires in a study. The same study demonstrated that more creative individuals exhibited higher levels of sacrificial behavior. According to Goleman (1995), individuals with high levels of emotional intelligence have great ability to help people, solve their problems and take responsibility. According to Baron (2008), although positive emotions increase the creativity of entrepreneurs and their ability to recognize opportunities, they also play a significant role in transforming the experiences of entrepreneurs into solutions through intuitive processes. A study conducted by Yitshaki (2012) showed that the charismatic and inspirational behavior of entrepreneurs that is considered to be effective on their followers to recognize and manage their emotions have an important impact on the emergence of new entrepreneurial behavior.

In studies conducted by different researchers, it was concluded that entrepreneurial behavior requires the ability to establish effective communications with others. The ability to interact with other people depends on high level of emotional intelligence and is significant for the ability to take advantage of opportunities and innovations (Chell & Baines, 2000; Duchseneau & Gartner, 1990; Rauch & Frese, 2007). Zampetakis et al. (2009) stated that emotional intelligence influences entrepreneurial behavior in two ways. First, individuals with high levels of emotional intelligence are more resilient to stress through self-efficacy. Second, those with a high level of emotional intelligence are proactive individuals, which in turn have more creative tendencies that enable them to engage in entrepreneurial behavior.

In a study on entrepreneurial behavior in organizations, it was concluded that emotional intelligence was related to individual entrepreneurial behavior such as independent / autonomous - integrative / collaborative behavior (Zampetakis et al.,

2009). However, it was observed that emotional intelligence affected entrepreneur behavior such as conciliation, procuring and organizing resources, determination and utilization of opportunities, stress management and leadership (Foo, Elfenbein, Tan & Aik, 2004; Rozell, Pettijohn & Parker, 2004). Jamshidi, Pool, and Khoshkorodi (2012) indicated that emotional intelligence plays an important role in enhancing self-efficacy perception of employees in the work environment.

Self-efficacy is considered as the most important component of achievement in Bandura's social cognitive learning theory and positive psychology. Self-efficacy has a decisive impact on the ability of the individual to control her / his emotions, thoughts and activities, as well as being an important factor in achieving a successful performance. Self-efficacy is the thoughts of an individual about self-capacity (Halper & Vancouver, 2016). Self-efficacy perception is defined as the belief of an individual in her or his own capacity to determine and implement the behavior required to achieve an objective (Bandura, 1997). Self-efficacy is a productive force in which cognitive, social, emotional and behavioral skills are effectively organized to achieve various goals. Therefore, self-efficacy influences the outcome of future actions and situations (Baron, Mueller & Wolfe, 2016). Self-efficacy is an important motivational structure that affects individual preferences, goals, emotional reactions, efforts and determination (Stajkovic & Luthans 1998). Self-efficacy is the basis of individual motivation, general well-being and personal success in life. Individuals are less willing to take action to confront difficulties unless they believe that their actions will result in the desired outcomes (Pajares, 2002). According to Krueger, Reilly and Carsrud (2000), self-efficacy is a prerequisite for entrepreneurship. Individuals with high self-efficacy have more internal motivation to conduct entrepreneurial task. They continue to make efforts without giving up, act in a more determined manner even when they face obstacles and mishaps. According to Heath & Tversky (1991), self-efficacy perception also has a significant impact on the risk taking tendency of an individual. Tierney and Farmer (2002) reported that an individual’s creativity is generally influenced by the same individual’s self-efficacy. Bandura (1997) indicated that individuals with a high level of self-efficacy perception are more likely to have challenging goals and creativity. Studies demonstrated that self-efficacy perception has a significant influence on entrepreneurial intentions and behavior (Sánchez, 2011; Shook & Bratianu, 2010; Pihie, 2009).

Today, when we consider the increasing global problems, there are several prevailing economic, social and health problems such as poverty and unemployment, hunger, various diseases, human rights, education and housing, and especially the negative consequences of wars and natural disasters (Akar & Aydın, 2015). It is, therefore, important to train social entrepreneur teachers who are sensitive to all above mentioned social problems and who try to solve these problems without expecting any compensation and who can create social values that could benefit all humanity. Because the teaching profession is not a profession limited to the activities of teaching conducted under the roof of the school. One of the most important functions of the teacher and the school is to produce permanent solutions to global

social problems and to conduct work that would benefit humanity. Social entrepreneur teachers do not have the intention and anxiety to make an economic gain when spending all these efforts. They are individuals who are motivated with the happiness of doing good for the humanity. According to Konaklı and Göğüş (2013), the design and realization of activities that can contribute to the development and change of the school environment are among the social entrepreneurship roles of the teachers. For instance, designing beneficial adult education, social welfare services, and learning products are the tools the entrepreneur teacher uses to respond to community problems and needs. Recently, interest in the social entrepreneurship roles of pre-service teachers was also reflected in studies. Literature review would demonstrate that these studies were concentrated on development of scales to determine social entrepreneurship traits of pre-service teachers (Konaklı & Göğüş, 2013), social entrepreneurship traits of social studies teachers (Çermik & Şahin, 2015; Yazici, Uslu & Arık, 2016), and the correlations between social entrepreneurship traits and personal traits (Akar & Aydın, 2015) and lifelong learning trends (Sezen-Gültekin & Gür-Erdoğan, 2016) and self-efficacy perceptions of pre-service teachers (Konaklı, 2015). In the present study, the mediating role of self-efficacy perceptions on the correlation between emotional intelligence levels and social entrepreneurship traits of pre-service teachers was examined. Thus, the research hypotheses were constructed as follows:

$H_1$: Emotional intelligence levels of pre-service teachers significantly predict their social entrepreneurship traits.
$H_2$: Emotional intelligence levels of pre-service teachers significantly predict their self-efficacy perceptions.
$H_3$: Self-efficacy perceptions of pre-service teachers significantly predict their social entrepreneurship traits.
$H_4$: Self-efficacy perceptions play a role of mediation in the relationship between emotional intelligence levels and social entrepreneurship traits of pre-service teachers.

## Method

The present study was conducted based on relational screening model. Relational screening model is a research model aimed to determine the presence or degree of covariance between two or more variables (Karasar, 2006). In the present study, the relationships between the emotional intelligence level, self-efficacy perception and social entrepreneurship traits of pre-service teachers were examined.

### Population and Sample

The population of the study included pre-service teachers attending Kilis 7 Aralık University Muallim Rifat Education Faculty during the 2015-2016 academic year. Data collection tools were sent to 1120 pre-service teachers who were studying in the faculty via e-mail. However, 360 scale forms were returned by the students. Thus, all statistical procedures were performed with the data obtained from 360 pre-service teachers. 37.8% of pre-service teachers were male, 62.2% were females;

18,1% were studying to become science teachers, 21,1% were studying to become preschool teachers, 15% were studying to become classroom teachers, 26,4% were studying to become social studies teachers and 19,4% were studying to become Turkish teachers; 13.6% were freshmen, 22.2% were sophomores, 17.5% were juniors and 46.7% were senior students.

## Data Collection Tools

Emotional intelligence scale, self-efficacy scale, social entrepreneurship scale and personal information form were used in data collection.Table 1

**Emotional intelligence scale – short form:** The emotional intelligence scale developed by Petrides and Furnham (2000) was adapted to Turkish by Deniz, Özer and Işık (2013). The scale is a 4-dimensional scale that includes 20 items and the scoring is conducted in a 7-point Likert scale. The scale dimensions are called "subjective well-being", "self-discipline", "emotionality" and "sociability". As observed by Deniz et al. (2013) in the analyses they conducted, the four-factor structure of the scale had a model fit ($\chi 2$ / df = 2.46, GFI = 0.95, AGFI = 0.92, CFI = 0.91, RMSEA = 0.056). In the adaptation study conducted by Deniz et al. (2013), the Cronbach alpha internal consistency coefficient for the scale was reported as .81, while it was .72 for the well-being sub-dimension, it was .70 for the self-discipline sub-dimension, it was .66 for the emotionality sub-dimension, and it was .70 for the sociability sub-dimension. The validity and reliability of the scale were retested in the present study. Confirmatory factor analysis (CFA) was performed to test the validity of the scale. CFA result showed that the scale had model fit ($\chi^2$/df=285.178/96=2.97, RMSEA = 0.074, CFI = 0.92, TLI = 0.90, GFI = 0.92, and AGFI = 0.88). Cronbach alpha internal consistency coefficient was .88 for the whole scale, while for the well-being subscale it was .83, for self-discipline subscale it was .82, for emotionality subscale it was .78, and for sociability subscale the Cronbach alpha internal consistency coefficient was .80.

**Self-Efficacy scale:** The self-efficacy scale developed by Schwarzer and Jerussalem (1992) was adapted to Turkish language by Yeşilay (1996). The scale is a one-dimensional 5-point Likert-type scale that includes 10 items. The scale measures the general self-efficacy perceptions of individuals based on their self-perceptions on their ability to overcome new and difficult tasks. Scale items are not specific to a specific field but include general expressions. The validity and reliability of the scale were retested within the scope of the present study. Confirmatory factor analysis (CFA) was performed to test the validity of the scale. CFA results demonstrated that the scale had model fit ($\chi 2$ / dF = 82.747 / 33 = 2.51, RMSEA = 0.065, CFI = 0.98, TLI = 0.97, GFI = 0.96, AGFI = 0.93). In the present study, the reliability of the scale was examined with Cronbach alpha internal consistency coefficient. The Cronbach alpha internal consistency coefficient was .94 for the whole scale.

**Pre-Service Teachers Social Entrepreneurship Scale:** The pre-service teachers social entrepreneurship scale developed by Konaklı and Göğüş (2013) is a

5-point Likert-type 21-item measure consisting of three dimensions; risk taking (7 items), self-confidence (8 items) and personal creativity (6 items). The analyzes conducted by Konaklı and Göğüş (2013) demonstrated that the 3-factor structure of the scale has model fit ($\chi 2$ / sd = 427.15 / 186 = 2.29; RMSEA = 0.063; NFI = 0.90; NNFI = 0.95; CFI = 0.95; GFI = 0.90; AGFI = 0.86). The Cronbach alpha internal consistency coefficient for the scale was reported to be .85 for the whole scale, while it was reported as .77 for the self-confidence subscale, .72 for the risk-taking subscale, and .70 for the personal creativity subscale. The validity and reliability of the scale were retested in the present study. Confirmatory factor analysis (CFA) was performed to test the scale validity. CFA results showed that the scale had model fit ($\chi 2$ / df = 475.540 / 183 = 2.60, RMSEA = 0.067, CFI = 0.93, TLI = 0.92, GFI = 0.89, AGFI = 0.86). Reliability of the scale was examined by Cronbach alpha internal consistency coefficient. The Cronbach alpha internal consistency coefficient for the whole scale was .92, while it was .89 for the self-confidence subscale, .84 for the risk-taking subscale, and .82 for the personal creativity subscale.

**Data Analysis**

In the analysis of the data, descriptive statistical methods were used to establish the current status, Pearson correlation analysis method was used to determine the correlations between the variables and the bootstrap method was used to determine the significance level of the mediation effect. Initially, confirmatory factor analysis (CFA) was conducted using the AMOS 22 software to test the fit of the scale with the research data. Descriptive and correlational analyzes for the study variables were then performed using SPSS software. Finally, the PROCESS macro, developed by Hayes (2008), which is provided free of charge to researchers at "http://www.processmacro.org/index.html" that integrates with SPSS and could perform mediation and regulatory tests was used. Based on "Model 4" available on the PROCESS macro, the sample size of 360 was reconstructed as 1000 with debugged and corrected bootstrap method at 95% confidence interval. The bootstrap method makes it possible to resample to produce very large data sets from the existing data set (Sacchi, 1998). Thus, instead of conducting analyses which may be meaningless with small data sets, more accurate results can be obtained with analyses conducted on larger data sets obtained by resampling. Bootstrap method does not require preconditions such as normal distribution, etc. In order for the mediation effect to be significant, the confidence interval (CI) should not contain "0" value (Hayes, 2009).

## Findings

The mean, standard error, and Pearson correlation coefficient figures for the emotional intelligence levels, self-efficacy perceptions, and social entrepreneurship traits of pre-service teachers that participated in the study are presented in Table 1.

Table 1

*Correlation Coefficient Values for the Emotional Intelligence Levels, Self-Efficacy Perceptions, and Social Entrepreneurship Traits of Pre-Service Teachers*

| **Variables** | $\bar{x}$ | **Ss** | **1** | **2** | **3** |
|---|---|---|---|---|---|
| 1.Social entrepreneurship | 3,81 | 0,61 | 1 | | |
| 2.Self-Efficacy | 3,75 | 0,77 | ,78** | 1 | |
| 3.Emotional intelligence | 4,94 | 0,79 | ,58** | ,63** | 1 |

**p<0,01

Table 1 demonstrates that there was a significant positive correlation between all variables included in the research model (p<0,01). There were high level of positive correlation between the self-efficacy perceptions and social entrepreneurship traits of pre-service teachers (r = 0.78; p<0.01), a positive correlation between emotional intelligence and social entrepreneurship traits (r = 0,58; p<0, 01), and a positive correlation between self-efficacy and emotional intelligence traits (r = 0,63; p<0,01). While the highest correlation was observed between self-efficacy and social entrepreneurship traits (r = 0.78), the lowest correlation was found between self-efficacy and emotional intelligence (r = 0.58). In Table 1, it was observed that the average scores of pre-service teachers for the variables of social entrepreneurship ($\bar{x}$ = 3.81), self-efficacy ($\bar{x}$ = 3.75) and emotional intelligence ($x$ = 4.94) were mostly in the intermediary level.

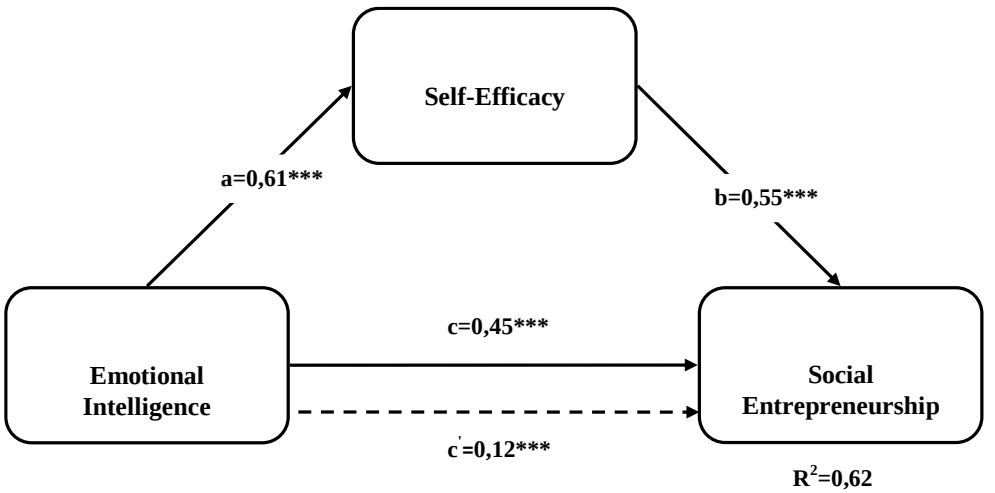
The procedure proposed by Baron and Kenny (1986) is frequently used to determine the mediation effect in the literature. The steps of this procedure are as follows;

**1)** The effect of the independent variable on the dependent variable should be significant.
**2)** The effect of the independent variable on the mediating variable should be significant.
**3)** The effect of the mediating variable on the dependent variable should be significant.
**4)** Finally, when the mediating variable and the independent variable are simultaneously analyzed, the previous significant correlation between the dependent and the independent variable must either become insignificant or the previous level of significance should reduce. If the effect between the independent variable and the dependent variable becomes insignificant, it is considered that there is full mediating effect and if theduced, there is a partial mediating effect.

The results for determination of the mediating role of self-efficacy perceptions in the correlation between emotional intelligence and social entrepreneurship levels of pre-service teachers are presented in Figure 1.

Figure 1

*The Mediating Role of Self-Efficacy Perceptions in the Correlation Between Emotional Intelligence and Social Entrepreneurship Levels of Pre-Service Teachers and Non-Standardized β Values*




***p<0,001

Figure 1 demonstrates the total effect of emotional intelligence on social entrepreneurship was significant (β = 0.45; t = 13.51; p<0.001). The direct effect of emotional intelligence on mediating variable self-efficacy was significant (β = 0.61; t = 15.21; p<0.001). The effect of mediating variable self-efficacy on social entrepreneurship was significant (β = 0.55; t = 16.50; p<0.001). The correlation between emotional intelligence and social entrepreneurship decreased when emotional intelligence and the mediating variable self-efficacy were included in the model simultaneously (c '= 0.12; t = 3.62; p<0.001). These findings demonstrated that all the steps of the procedure proposed by Baron and Kenny (1986) were met. Thus, it could be argued that self-efficacy plays a mediating role in the relationship between emotional intelligence and social entrepreneurship. Furthermore, emotional intelligence and self-efficacy account for 62% of the total variance in social entrepreneurship.

The indirect, direct, and total effects on the study variables are as shown in Table 2.

Table 2

*The Effects between the Emotional Intelligence Levels, Self-Efficacy Perceptions and Social Entrepreneurship Traits of Pre-Service Teachers*

| | | | | | Bootstrapping % 95 CI | |
|---|---|---|---|---|---|---|
| **Effects** | **Point Estimate** | **SE** | **z** | **p** | **Low Level** | **High Level** |
| Indirect effect | 0,3325 | 0,0394 | 11,170 | 0,000*** | 0,258 | 0,414 |
| Direct effect | 0,1166 | 0,0322 | | | 0,053 | 0,180 |
| Total effect | 0,4491 | 0,0332 | | | 0,384 | 0,514 |

To determine the level of significance of the indirect effect, the results obtained when the sampling size was determined as 1000 and debugged and corrected bootstrap analysis was conducted within the 95% confidence interval are presented in Table 2. The indirect effect of emotional intelligence on social entrepreneurship via self-efficacy perception was statistically significant according to Table 2 (Indirect Impact = 0,3325 and 95% BCA GA [0,258- 0,414]). Based on the study findings, it could be argued that all research hypotheses (H1, H2, H3 and H4) were confirmed.

## Conclusion and Recommendations

The objective of the present study was to determine the mediating effect of self-efficacy perception on the correlation between the levels of emotional intelligence and social entrepreneurship traits of pre-service teachers. As a result of the analysis conducted with the collected data, it was concluded that there was a positive correlation between emotional intelligence levels, self-efficacy perceptions and social entrepreneurship traits of pre-service teachers, and that the self-efficacy perceptions of pre-service teachers had a partial mediating role in the correlation between emotional intelligence level and social entrepreneurship traits. Furthermore, it was found that emotional intelligence levels and self-efficacy perceptions of pre-service teachers accounted for 62% of the total variance associated with social entrepreneurship traits. Based on these results, it could be argued that all the research hypotheses were confirmed.

The results related to the first hypothesis of the research demonstrated that there was a moderately significant positive correlation between the levels of emotional intelligence and social entrepreneurship of pre-service teachers, and that emotional intelligence levels of pre-service teachers significantly predicted their social entrepreneurship traits. This finding is consistent with previous study results (Kashif, Khurshid & Zahid, 2016; Oriarewo, Agbim & Zever, 2014; Nezhad, Marjani & Najafi, 2015). Based on this finding, it could be argued that the improvement of well-being levels of pre-service teachers, their ability to understand and manage their own and others' emotions, and their level of competence in interpersonal relations could increase entrepreneurial activities that aim to solve social problems. According to

Zampetakis et al. (2009), those who could understand and express their own feelings could recognize and accept their own emotions before others do. The ability to notice and recognize emotions could make it easier for entrepreneurs to regulate their emotions when needed. Davis and Peake (2014) argued that individuals with a high level of emotional intelligence might be more successful in overcoming a fear of failure about their entrepreneurial intentions. Thus, it could be argued that the candidates with a high level of emotional intelligence would be able to manage their negative emotions such as fear and anxiety better that could arise when they start a new business. In other words, if the pre-service teacher has the ability to manage her or his emotions, the anxiety of failure could be reduced. Furthermore, it would be easier to maintain the desire to engage in a new business. According to Bar-On (1997), individuals with high levels of emotional intelligence could more easily cope with stress and uncertainty, while at the same time improving thier health and well-being. Chell and Baines (2000) stated that high emotional intelligence perception positively affects interpersonal relationships. The skill of establishing quality relationships with other individuals is often regarded as one of the prerequisites of the attempt to exploit opportunities and innovations. Thus, it could be argued that pre-service teachers who could manage their emotions well, decrease the adverse effects of negative emotions and interact with others easily using high social skills are likely to engage in novel incentives.

The results related to the second hypothesis of the study demonstrated that there was a significant positive correlation between emotional intelligence levels and self-efficacy perceptions of pre-service teachers, and that emotional intelligence levels of pre-service teachers significantly predicted their self-efficacy perceptions. This finding is consistent with the results of previous studies (Rastegar & Memarpour, 2009; Moafian & Ghanizadeh, 2009; Gürol, Özercan & Yalçın, 2010; Koçoğlu, 2011; Sarkhosh & Rezaee, 2014). Based on these findings, it could be argued that the self-efficacy perceptions of pre-service teachers who are aware and able to manage their emotions would be positively affected.

The results related to the third hypothesis of the study demonstrated that there was a high level positive correlation between self-efficacy perceptions and social entrepreneurship traits of pre-service teachers and that self-efficacy perceptions of pre-service teachers significantly predicted their social entrepreneurship traits. This finding was consistent with the results of previous studies (Konakli, 2015; Urban 2015; Pihie & Bagheri, 2013; Shinnar, Hsu & Powell, 2014). Based on this finding, it could be argued that the increase in self-efficacy perceptions of pre-service teachers might contribute to their social entrepreneurship traits. Entrepreneurial self-efficacy affects their choices, enthusiasm, efforts, and commitment, when entrepreneurs face difficulties (Boyd & Vozikis, 1994). Entrepreneurial self-efficacy perceptions play an important role in initiating and sustaining a new initiative (Kickul et al., 2008). It is expected of an individual who thinks he or she has the necessary qualifications for a successful venture to behave in an entrepreneurial manner and to be determined about sustaining these behaviors. Only belief in one's self would not result in behavior, it is also necessary to have intent that would turn belief into action. Self-

efficacy is considered as a significant variable in determining both the entrepreneurial intent and the likelihood that this intention would result in entrepreneurial action. Self-efficacy is also known to affect the behavior, goals, resolution and performances of individuals (Zhao, Seibert & Hill, 2005; Boyd & Vozikis, 1994). Individuals with high self-efficacy perceptions and high levels of entrepreneurial intentions are more likely to engage in entrepreneurial activities later in their lives (Carr & Sequeira, 2007; Kickul, Wilson, Marlino & Barbosa 2008). Individuals who do not believe in their own abilities are disappointed when faced with risky situations and are unable to produce an effective performance. Such individuals are often afraid of dealing with hard work. As a result, their performances are negatively affected and their feelings of inadequacy increase (Maddux, 1995). The self-efficacy perception has an important effect on the individual's risk-taking tendencies. Because individuals can take risks that are perceived within their competencies (Zakarevičius & Župerka, 2010). Thus, it could be argued that the belief of pre-service teachers in their own knowledge, skills and abilities in finding original and permanent solutions for a social problem, and in self ability to solve these problems would encourage pre-service teachers to take risks and try new things, as well as promoting them to continue to engage in entrepreneurship activities against the encountered difficulties.

The results related to the fourth hypothesis of the study demonstrated that self-efficacy perceptions play a mediating role in the correlation between emotional intelligence levels and social entrepreneurship traits of pre-service teachers. Based on this finding, it was concluded that level of emotional intelligence of pre-service teachers indirectly influenced their social entrepreneurship traits as well as their self-efficacy perceptions. Mortan, Ripoll, Carvalho and Bernal (2014) also reported similar results. According to Mortan et al., emotional intelligence plays an important role in prediction of entrepreneurial processes. The capacity to organize and use emotions affects the self-efficacy of pre-service teacher significantly, which in turn encourages them to become entrepreneurs. Pre-service teachers with a high emotional intelligence perception have a high self-confidence about their entrepreneurial skills and perceive themselves as individuals with more and better opportunities to engage in entrepreneurial activities. In the study conducted by Javed, Ali, Hamid, Shahid and Kulosoom (2016), it was reported that emotional intelligence positively affected self-efficacy perception and entrepreneurial intent. Salvador (2008) suggested that certain components of emotional intelligence have a positive effect on self-efficacy, that emotional intelligence played a significant role in improving entrepreneurial self-efficacy, and that people with high levels of emotional intelligence were more likely to pursue entrepreneurial activities. Research demonstrated that individuals with a high level of emotional intelligence have an internal control focus and could motivate themselves (Deniz, Tras & Aydoğan, 2009). Gagne and Deci (2005) stated that self-motivated people could have high level of self-confidence, self-esteem and self-perception. Bandura (1997) noted that self-efficacy perceptions of individuals who trust their own abilities would be positively affected. It is possible that someone who believes that they can succeed in a particular task is likely to engage in new tasks and more likely to take risks. It

could be argued that the characteristics of pre-service teachers who are aware of their own emotions and those of others and could manage these emotions and thus, could improve their well-being, who have high social skills, and possess self-discipline could affect their self-efficacy perceptions about accomplishing a task and in turn would contribute to problem solving behavior about social issues.

Based on the study results, it could be argued that studies on improving the emotional intelligence of the pre-service teachers could develop their self-efficacy perceptions and social entrepreneurship traits. Thus, pre-service teachers should be provided with rich experiences in courses such as social services and social responsibility projects that would increase their self-awareness in the school environment, help them control their emotions and improve their social skills, while also enhancing their awareness on social issues.

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# Development and Validation of Formative Feedback Perceptions Scale in Project Courses for Undergraduate Students

**Mustafa Şat***

## Abstract

There has been an increasing trend towards project-based approach in higher education. For that reason, assessing and evaluating students' perceptions on formative feedback becomes an important aspect of students' learning in groupwork. Valid and reliable instruments are required to measure how students perceive formative feedback given to them from multiple sources. Therefore, the aim of the current study is to develop and validate a multidimensional formative feedback perception scale (FFPS) for the assessment of undergraduate students' perceptions on formative feedback provided to them as individuals or as a group on their project work. This study was implemented in three phases. In the first phase, qualitative data through interviews with 10 participants were used in development of the items for the scale. In the second phase, quantitative data from 97 undergraduate students were used to ensure validity and reliability of the new scale through exploratory factor analysis. Three dimensions emerged and were interpreted as development, understandability, and encouragement. In the third phase, data collected from an independent sample of 250 undergraduate students were used to confirm the factorial structure of the 25-item FFPS through confirmatory factor analysis. This new scale will serve as a useful tool for researchers, practitioners andindividuals in higher education in order to assess students' formative feedback perceptions in various work-based and experiential learning environments.

***Keywords:*** formative feedback perceptions, scale development, undergraduate students, projects-based course

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# Lisans Öğrencileri İçin Proje Derslerinde Verilen Biçimlendirici Geri Bildirim Algı Ölçeğinin Geliştirilmesi ve Geçerliği


## Öz

Yükseköğretim ortamlarında proje temelli yaklaşıma yönelik gittikçe artan bir eğilim oluşmuştur. Bu nedenle, öğrencilerin biçimlendirici geri bildirim üzerine algılarını değerlendirmek ve ölçmek, öğrencilerin grup çalışmasında öğrenmelerinin önemli bir parçası haline gelmiştir. Öğrencilerin çoklu kaynaklardan kendilerine verilen biçimlendirici geri bildirimi nasıl algıladıklarını ölçmek için geçerli ve güvenilir bir ölçek geliştirme gereği oluşmuştur. Önemli olan bu ihtiyacı karşılamak için, bu çalışmanın amacı, lisans öğrencilerinin proje çalışması sırasında bireysel veya grup olarak aldıkları biçimlendirici geri bildirim hakkındaki algılarına yönelik çok boyutlu bir ölçek geliştirmektir. Üç aşamadan oluşan bu çalışmanın ilk aşamasında 10 katılımcı ile görüşülmüş, elde edilen nitel veriler kullanılarak ölçek maddeleri geliştirilmiştir. İkinci aşamada ölçeğin geçerliği ve güvenirliği sağlamak için 97 lisans öğrencisinden elde edilen nicel veriler açımlayıcı faktör analizi ile incelenmiştir. İkinci aşamada ölçeğin geçerliği ve güvenirliğini sağlamak için 97 lisans öğrencisinden elde edilen nicel veriler açımlayıcı faktör analizi ile incelenmiştir. Analiz sonunda ortaya çıkan üç boyut "gelişme", "anlaşılırlık ve uygunluk" ve "teşvik etme" olarak isimlendirilmiştir. En son aşamada ise 250 öğrenciden oluşan farklı bir desenden elde edilen veriler kullanılarak 25 maddelik ölçeğin faktör yapısı doğrulayıcı faktör analizi ile incelenmiştir. Geliştirilen bu ölçeğin grup çalışmasına dayalı çeşitli öğrenme ortamlarında öğrencilerin biçimlendirici geri bildirim algılarını ölçmek için araştırmacılara, uygulayıcılara ve akademisyenlere yarar sağlayacağı düşünülmektedir.


***Anahtar Sözcükler:*** biçimlendirici geri bildirim algısı, ölçek geliştirme, lisans öğrencileri, proje tabanlı ders

## Introduction

Project-based learning (PBL) is a student-centered pedagogy basically formed on the concept of "learning by doing" which was outlined by Dewey in 1897. It has been used pervasively across disciplines as a 21st-century strategy for helping learners actively explore real-world problems and challenges through investigating and collaborating. PBL is described as a learning strategy design that organises learning around the project (Thomas, 2000). An instance of PBL can be characterised by distinctive features such as being central to curriculum, including problems that link activities with underlying conceptual knowledge, involving enquiry process of constructing and transforming knowledge, consisting of learning settings which are mainly driven by students, and incorporating authentic and realistic challenges (Thomas, 2000; Helle, Tynjälä, & Olkinuora, 2006). PBL environment is based on a constructivist approach, designed to promote student-centred learning where the instructor and teaching assistants act as facilitators and mentors, and students are encouraged to deal with problems encountered during learning process. Students are motivated to apply acquired knowledge and skills to achieve learning objectives through constructing their own knowledge and understanding, working independently, or by collaborating in teams, through interaction with an instructor, teaching assistants, and their peers (Thomas, 2000). In accomplishing those objectives in PBL, continuous formative assessment, revision, and evaluation of student performance on project-related teams are quite important.

Previous studies considered formative feedback as a prominent means to advance learning (Hattie, 2008; Wiliam, 2011) and suggested that the role of formative feedback in PBL is significant (Fernandes, Flores, & Lima, 2012; Sadler, 1998). In addition, comprehensive literature reviews on formative assessment revealed that formative feedback facilitates and enhances self-regulated learning (Nicol & Macfarlane- Dick, 2006; Sadler, 1989) by helping students deeply involved in meta-cognitive strategies such as personal goal-planning, monitoring, and reflection (Clark, 2012), and therefore plays a crucial role in the assessment process at the centre of formative assessment (Black & Wiliam, 1998). This makes feedback both central to student learning and also very powerful in facilitating learning (Bandura, 1991).

Certain types of qualitative and quantitative human assessment and judgement are in play when any type of feedback is given on students' team works by their instructor or teaching assistant(s). Feedback (i.e. summative and formative) is asserted to be a process of communication (Higgins, Hartley, & Skelton, 2001) in which the quality of student performance related to the work is evaluated (Sadler, 1989). However, not all feedback can necessarily be considered as formative in nature. Formative feedback described in this study refers to evaluative or corrective information given to individual members of a group or to the group as a whole (London & Sessa, 2006). Taras (2002) puts forward some characteristics in order for feedback to be considered formative. For example, understanding of students (as individuals or as a group) regarding assessment and judgement of their work and how they can avoid deficiencies in the future. Moreover, a subsequent piece of work

that is required to be produced by the students with the problems successfully addressed and remedied.

The nature of the task, the students' needs, and learning environment can result in feedback with different functions (Knight & Yorke, 2003; Poulos & Mahony, 2008). For some, feedback is information aiming to close the gap between current performance and expected performance (Ramaprasad, 1983; Sadler, 1989; Lizzio & Wilson, 2008; Draper, 2009; Wiliam, 2011) by reforming the student's understanding so that learning improves (Shute, 2008). For others, in addition to nurturing ongoing performance towards a target standard, feedback functions to move the current work forwards and to influence the quality of subsequent work (Schraw, Crippen, & Hartley, 2006; Hounsell et al., 2008; Boud & Molloy, 2013). In her seminal article, Ramaprasad (1983, p. 4) defined feedback as "information about the gap between the actual level and the reference level of a system parameter which is used to alter the gap in some way". The conception of formative feedback held by this study corresponds to the aforementioned notions and relies heavily on the definition of Ramaprasad (1983), just as it is convenient to refer to "formative feedback" as noted by Taras (2005).

Several studies have attempted to develop conventional and standardised feedback perception scales in order to elaborate on the feedback issue in conventional classroom settings (Lizzio & Wilson, 2008; Rowe & Wood, 2008). However, conventional and standardised feedback perception scales, where feedback is measured as an assessment of individual student performance, may not be appropriate to fully understand formative feedback as provided on team project works. This is because, in PBL, strengths and weaknesses from the students' point of view involves assessment of the multimode of team performance, skills, and ideas with formative feedback given as multidimensional forms from multiple sources. Therefore, the purpose of this study is to develop a multidimensional scale that can be used to measure undergraduate students' formative feedback perceptions not only in PBL settings within science programmes but also in engineering programmes.

## Context of the Study

Computer Education and Instructional Technology undergraduate programme offers several project-based courses with very strong emphasis on project design and development. These courses are designed based constructivist approach where students construct their own knowledge by interacting with staff and colleagues. In general, there are two types of project carried out by students throughout the semester: small-scale and large-scale. While small-scale projects span two to four weeks, large-scale projects span from five weeks to two semesters. Students commonly utilize various cutting-edge educational software and programs as well as well-known instructional design models (e.g., ASSURE, ADDIE model) in order to design and develop their educational product. The completion of the course is depended on development of an education project with acquired knowledge and skills during the course, comprehensive written tasks such as a project report and portfolio and a multimedia presentation. While working on the project, students, as a

group or individuals, meet with staff (instructor and teaching assistants) regularly each week. During these meetings they discuss the flow of their projects, written reports and any issues they faced during the process and receive both written and oral comments regarding their progress. This face-to-face interaction and dialogue also continues in electronic form within online environments through e-mail, open courseware, and social media, especially Facebook. The primary forms of feedback provided during project work sessions was oral feedback given in face-to-face meetings, and written feedback given on draft project work and reports. The roles of the instructor and teaching assistants are to coordinate teams, support them in solving their problems and to monitor the development of the project by providing students with oral and written formative feedback with regards to their achievement and performance.

## Method

### Samples

Two independent samples of senior and junior undergraduate students from the same programme were recruited from four Turkish public universities in order to provide psychometric evidence for the formative feedback perceptions scale (FFPS). FFPS was developed into two phases: a pilot and the main study. While Sample 1 was used in the pilot study in order to identify and reveal factor structure for the FFPS, Sample 2 was used in the main study to perform cross-validation of the factor structure of FFPS. Sample 1 consisted of 53 senior and 44 junior undergraduates (N = 97; 63 males and 34 females), whilst Sample 2 consisted of 112 senior and 138 junior undergraduates (N = 250; 109 males and 141 females) (see table 1). Convenience sampling method was used for the selection of both Sample 1 and Sample 2. The questionnaire was distributed during course hours with the help of lecturers at the universities. The procedures of the current study were approved by Middle East Technical University Human Subject Ethics Committee.

Table 1

*Descriptive Statistics of Participants*

| | Class | | Gender | | |
|---|---|---|---|---|---|
| | 3rd | 4th | Male | Female | Total |
| Sample 1 | | | | | |
| Middle East Technical University | 44 | 53 | 63 | 34 | 97 |
| Sample 2 | | | | | |
| Amasya University | 36 | 29 | 23 | 42 | 65 |
| Ankara University | 47 | 38 | 40 | 45 | 85 |
| Hacettepe University | 55 | 45 | 46 | 54 | 100 |

### Instrumentation

### Participant selection for semi-structured interviews

In this study, the FFPS was designed to examine undergraduate students' perceptions exclusively on formative feedback given to them for their projects and project-related documents. Therefore, purposive sampling was adopted to select

participants for the semi-structured interviews. The criterion for sampling was that the participants should be among the most successful 20% of the students who had recently taken the "Instructional Feedback Design and Development" elective course, because in-depth understanding of the concept of "formative feedback" was deemed necessary for the interviews. Data were collected from the university that offered this course. Among 15 students identified by the instructor based on the criterion, 10 students agreed to participate (seven male, three female).

## Formative feedback perceptions questionnaire

The instrument development process took place in several phases. In the first phase, contingent decisions were made based upon the constructs underlying formative feedback perceptions. For this purpose, a comprehensive in-depth relevant literature review was conducted and the previously described constructs underlying feedback perceptions in the context of higher education were identified and noted. During iterative review, particular attention was paid to items in previously developed feedback-related questionnaires due to being convenient for this study. In the second phase, the qualitative dataset collected through the interviews were examined in detail, based on each theme and corresponding subtheme, in order to detect and select, and then each questionnaire item was formulated and written. Qualitative data analysis culminated in the exploration of main themes which were then used to merge with the dimensions of feedback perceptions identified as a result of the literature review. Based on the decisions after merging, three dimensions that addressed different aspects of formative feedback perceptions were proposed: development, encouragement, and understandability. After the three dimensions had been decided, an initial item pool composed of 40 items was generated, each representing different dimensions underlying the formative feedback perception. In the third phase, experts and specialists in instructional feedback practices examined the item pool of FFPS related to content and face validity. Independent cognitive interviews were conducted with one graduate student and two undergraduate students in order to pretest the FFPS. Based on the feedback from the cognitive interviews, except for a few items which were reworded to ensure better readability and understandability of the items, those remaining were accepted without revision. The scale items were measured on a 5-point Likert-type rating scale, ranging from "never" through to "very frequently". Demographic information including gender, university, education level, and cumulative average was also captured.

Specifically, in writing the items, interview data analysis results were predominantly used and supported by relevant studies identified from the literature. While several items were taken directly from interview transcripts, some items were adapted and rewritten by the researcher according to the guidelines of Groves et al. (2009), Dillman (2007), and Oppenheim (1992).

Since the medium of instruction at one university is English and the other three is Turkish, the questionnaire was developed both in the English language (see Appendix) and also in Turkish. For content validity, both versions of the questionnaire were reviewed for their equality by an ESL English Language

instructor. Furthermore, one instructor who has considerable expertise in the subject of feedback practices contributed heavily to every step of instrument development such as final decisions on writing and selection of the items. In addition, two independent instructors with expertise in questionnaire design and the content of the questionnaire also reviewed the questionnaire items for content validity of the instrument. Based on the feedback from the experts, several items were re-worded and some items refined to ensure they were clear and relevant to the formative feedback context.

### Data Analysis

The data analysis process was accomplished in four steps. Specifically, it started with identification of the factor structure of FFPS through the use of exploratory factor analysis (EFA), and continued with cross-validation of the factor structure with confirmatory factor analysis (CFA), and then finalised through estimation of each dimension's internal consistency by reliability coefficients. Further validity evidence was also provided.

## Results

### Sample 1 - Pilot Study Procedures, Data Analyses, and Results

In an attempt to understand the structure of a group of measured variables and to find out latent constructs by removing unutilised measured variables and retaining utilised measured variables, exploratory factor analysis was conducted (Field, 2009). The FFPS was administered to 97 undergraduate students who have taken or are taking project-based courses. Before conducting exploratory factor analysis, the results of the parallel analysis, the Bartlett's test of sphericity and the Kaiser-Meyer-Olkin (KMO) measure of sample adequacy were examined in order to determine the appropriateness of factor analysis. Since the data were adequately normally distributed and variables were correlated, Maximum Likelihood as an extraction method (Fabrigar et al., 1999) and Direct oblimin as oblique rotation method (Costello & Osborne, 2005) were selected. For retention of the number of factors, instead of scree plot which can be problematic (O'connor, 2000) and may cause underestimating and/or overestimating (Zwick & Velicer, 1986), parallel analysis was used as recommended in the literature (Fabrigar et al., 1999; O'connor, 2000; Costello & Osborne, 2005).

Parallel analysis yielded three factors for FFPS. Accordingly, factors of each scale were extracted based on a fixed number of three factors. Bartlett's test was significant (BTS value= 1357.89, $p < 0.05$), indicating that for FFPS the identity matrix and correlation matrix were significantly different from each other. Moreover, the KMO measure of sampling adequacy of 0.90 revealed that it was appropriate to perform factor analysis (Tabachnick & Fidell, 2007). The three factors of FFPS were retained and interpreted as relating to development (DEV), understandability (UND),

and encouragement (ENC). The 57.47% of variance explained by the three factors were deemed conceptually sufficient (Scherer et al., 1988).

Items whose loading was above 0.30 were deemed satisfactory and therefore considered to load on a factor (Stevens, 2009; Tabachnick & Fidell, 2013). Item communalities were also inspected and items with communality below 0.40 were furthered scrutinised for inclusion or exclusion (Costello & Osborne, 2005). After the items were inspected based on the criteria mentioned, eight items were excluded from further analysis due to low correlation and seven items were removed because of cross-loading or no loading. As can be seen from Table 2, all the remaining items had pattern coefficients greater than 0.46. A few items with low communalities were observed, yet it was decided to retain them for further examination due to their significance to the three-factor model. Analysis of data from this pilot study culminated with FFPS consisting of 25 items and three dimensions. Table 2 illustrates factor loadings, communalities, internal consistency reliabilities, and factor correlation.

Three dimensions along with their definitions are as follows:

1) Developmental aspect (DA) (11 items): It is the degree to which formative feedback given to project work is perceived by team members (individuals and group) with characteristics such as giving direction during the process of project work revision, explaining how to revise in detail, and providing what needs to be done in order to improve weak performance etc.

2) Encouragement aspect (EA) (7 items): It is the degree to which formative feedback given to project work is perceived by team members (individuals and group) with characteristics such as motivation to revise, having a positive tone and manner, and showing the instructor cares about the work being performed etc.

3) Understandability aspect (UA) (7 items): It is the degree to which formative feedback given to project work is perceived by team members (individuals and group) with characteristics such as being easy to understand, consistent, easy to read, and has relevance to the topic/problem etc.

Table 2

*Exploratory Factor Analysis with Oblique Rotation, Communalities and Reliability Analysis of all Items*

| | Factor loading | | | | | |
|---|---|---|---|---|---|---|
| Items | 1 | 2 | 3 | $h^2$ | Cronbach's alpha if item deleted | Cronbach's alpha |
| Factor I: Development | | | | | | 0.92 |
| Item 1 | **0.92** | -0.09 | -0.01 | 0.77 | 0.90 | |
| Item 7 | **0.86** | 0.06 | -0.08 | 0.72 | 0.90 | |
| Item 3 | **0.76** | -0.17 | 0.02 | 0.52 | 0.91 | |
| Item 5 | **0.69** | 0.01 | 0.00 | 0.49 | 0.91 | |
| Item 8 | **0.69** | 0.03 | -0.03 | 0.47 | 0.91 | |
| Item 6 | **0.61** | 0.08 | 0.14 | 0.54 | 0.91 | |
| Item 9 | **0.61** | 0.22 | 0.00 | 0.53 | 0.91 | |
| Item 11 | **0.60** | 0.15 | 0.09 | 0.52 | 0.91 | |
| Item 10 | **0.58** | 0.16 | 0.04 | 0.46 | 0.91 | |
| Item 2 | **0.53** | 0.24 | 0.03 | 0.47 | 0.91 | |
| Item 4 | **0.47** | 0.13 | 0.19 | 0.43 | 0.92 | |
| Factor II: Encouragement | | | | | | 0.88 |
| Item 19 | 0.02 | **0.84** | 0.02 | 0.74 | 0.85 | |
| Item 24 | 0.06 | **0.82** | 0.01 | 0.72 | 0.86 | |
| Item 20 | 0.07 | **0.64** | 0.22 | 0.62 | 0.87 | |
| Item 25 | -0.03 | **0.61** | 0.13 | 0.43 | 0.87 | |
| Item 22 | 0.17 | **0.59** | -0.05 | 0.44 | 0.87 | |
| Item 23 | 0.04 | **0.59** | -0.03 | 0.35 | 0.88 | |
| Item 21 | 0.19 | **0.53** | 0.14 | 0.50 | 0.87 | |
| Factor III: Understandability | | | | | | 0.83 |
| Item 12 | -0.17 | 0.14 | **0.84** | 0.69 | 0.79 | |
| Item 13 | -0.06 | 0.08 | **0.69** | 0.48 | 0.81 | |
| Item 15 | -0.05 | 0.26 | **0.56** | 0.46 | 0.81 | |
| Item 17 | 0.21 | -0.27 | **0.56** | 0.38 | 0.82 | |
| Item 18 | 0.22 | -0.02 | **0.48** | 0.37 | 0.81 | |
| Item 16 | 0.25 | 0.03 | **0.47** | 0.42 | 0.81 | |
| Item 14 | 0.17 | 0.19 | **0.47** | 0.45 | 0.81 | |
| Overall Cronbach's alpha | | | | | | 0.93 |
| Factor correlations | | | | | | |
| Factor 1 | - | | | | | |
| Factor 2 | 0.41 | - | | | | |
| Factor 3 | 0.49 | 0.40 | - | | | |

*Note:* N=97. Boldface indicates highest factor loadings. Reliability represents composite Cronbach's alpha for items in a factor. Item reflects response choices of; 1=Never, 2=Rarely, 3=Occasionally, 4=Frequently, and 5=Very frequently. $h^2$=Communality after extraction.

## Reliability analysis with Sample 1

In an attempt to measure internal consistency of the scale, Cronbach's alpha test was applied. While conducting the test, a separate Cronbach's alpha reliability coefficient was calculated for each of the scale's items with each dimension. As can be observed from Table 1, overall Cronbach's alpha reliability coefficient is 0.93,

indicating satisfactory and good internal consistency (DeVellis, 2003; Field, 2009). As for the internal consistency reliabilities of the items within each dimension, test results yielded 0.92 for DEV, 0.88 for ENC, and 0.83 for UND, which are regarded as showing good internal consistency as they are larger than 0.70, and are therefore accepted as a sign of acceptable reliability (Nunnally, 1978).

## Sample 2 - Main Study Procedures, Data Analyses, and Results

The main study was conducted to confirm construct validity of the factor structure of the scores obtained from the 25-item FFPS, and to identify whether or not the number of factors fixed a priori. CFA was employed using the analysis of moment structures (AMOS version 20) statistical software package. The method of maximum likelihood estimations was employed and three aspects of FFPS were allowed to correlate to each other as seen in Figure 1, which illustrates the model specification and the parameter estimates.

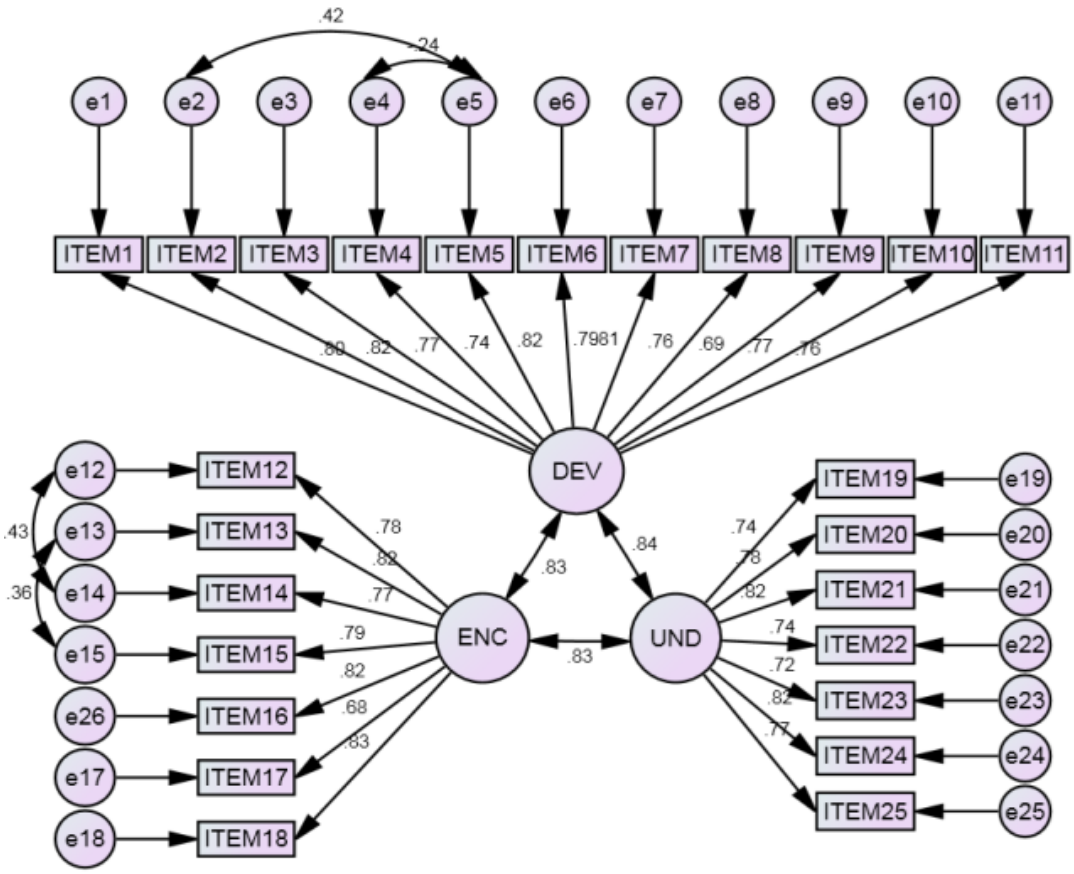


Figure 1

*Standardized Coefficients for the Three-Factor Model of FFPS*

Multiple goodness-of-fit indexes were used based on the suggestion of Brown (2006) in order to evaluate the overall model fit for FFPS. These are Chi-square ($\chi 2$) (Schermelleh-engel, Moosbrugger, & Müller, 2003), Comparative Fit Index (CFI;

Bentler, 1990), Tucker Lewis Index (TLI; Bentler, 1990), and Root Mean Square Error of Approximation (RMSEA; Browne & Cudeck, 1993). Bentler (1990) reported that CFI and TLI in the range of 0.90-0.95 is indicative of an acceptable fit of the model. RMSEA equal to or smaller than 0.08 indicates acceptable fit (Browne & Cudeck, 1993; Schermelleh-engel, Moosbrugger, & Müller, 2003). Authors have criticised chi-square statistics due to being highly sensitive to sample size (Kline, 1998); therefore, it was elected not to be considered for this study.

CFA results suggested that the three-factor structure for FFPS has a reasonable fit to the data with all indices. Specification errors caused by shared variance among items were noticed, therefore, minor modifications to the model were deemed necessary in order to improve the fit. The modification indices between items guided to the covariate of e2-e5, e4-e5, e12-e14, and e13-e15. The final result suggested a CFI value of 0.92, a TLI value of 0.91, and RMSEA value of 0.078 which indicates an acceptable model fit. Moreover, factor loadings were found to be significant ($p < 0.001$). Figure 1 illustrates the model specification and the parameter estimates.

**Convergent and discriminant validity with Sample 2**

Convergent and discriminant validity are the tests used to control validity of the scale. Convergent validity refers to the degree to which each score of the item are correlated with the corresponding factor. According to Hair et al. (2010), three methods are indicators of convergent validity. The first and second indicators are that item loading under the corresponding factor and average variance extracted (AVE) for each factor should be greater than 0.50. As for last indicator, the construct reliability (CR) value should exceed 0.70. Results showed that item loadings changed between 0.68 and 0.83 and were significant in that it supports that all items are related to the corresponding factor. As shown in Table 3, AVE and CR value for each factor were larger than the suggested criterion (> 0.70). Together all the results supported the convergent validity of FFPS.

Table 3

*Convergent Validity Results*

| | **DEV** | **ENC** | **UND** |
|---|---|---|---|
| AVE | 0.603 | 0.621 | 0.595 |
| CR | 0.943 | 0.920 | 0.911 |

As for discriminant validity, it relates to the degree to which each factor measures a different dimension of the construct. The indicator, as suggested by Hair et al. (2010), is that Chi-square value for the default three-factor model and one-factor model should be significantly different. As indicated in Table 4, there is a significant difference between Chi-square values of the two models, suggesting that the three-factor model was better than the one-factor model.

Table 4

*Model Comparison Results*

| **Model 1 (three-factor)** | **Model 2 (one-factor)** |
|---|---|
| $\chi^2$ = 683.730 | $\chi^2$ = 1,016.747 |
| sd = 268 | sd = 271 |
| *p*=.000 | *p*=.000 |
| $\chi^2_2 - \chi^2_1 = 333.017$ | |
| $Sd_2 - sd_1 = 3$ | |

## Discussion and Conclusion

The three-dimension Formative Feedback Perceptions Scale (FFPS) was developed following an in-depth literature review and semi structure interviews with participants. The current study was two-phase with the use of exploratory sequential mixed methods design. The first phase sought to explore the dimensions of formative feedback perceptions and then proceeded with a second phase in order to develop a questionnaire to measure formative feedback perceptions.

Findings from the qualitative phase of the study and review of the literature were used to develop the items and reveal the dimensions of FFPS. The interview transcripts were used to write the items and supported by statements that were used in relevant literature. Two independent sample groups of undergraduate students (Sample 1 and Sample 2) were used to validate FFPS through exploratory factor analysis and confirmatory factor analysis, which revealed a three-factor structure for the FFPS. Sample 1 consisted of 97 undergraduate students who participated in a pilot study in which exploratory factor analysis was used to test the factorial structure of the FFPS. In the main study, CFA was conducted to confirm the three-dimensional model of the FFPS on data gathered from Sample 2 (a further 250 undergraduate students). The 25-item FFPS was found to measure three dimensions of formative feedback perceptions named accordingly as follows with the corresponding items:

(1) Development Items: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11
(2) Encouragement Items: 12, 13, 14, 15, 16, 17, 18
(3) Understandability Items: 19, 20, 21, 22, 23, 24, 25

The construct validity of the FFPS scores was ensured though CFA. Specifically, the results of the CFA indicated that the contribution of the items with high pattern coefficients to the factors under which they were located was significant. In addition, the study showed that the three-factor model was a reasonable fit to all indices (TLI=0.9; CFI=0.92; RMSEA=0.078). Further validation analysis tested for discriminant and convergent validity, and also showed that all the items converge on the corresponding dimension. Taken together, these results provide sufficient evidence that the construct validity of the FFPS scores were well established with the sample of undergraduate students. Examination of internal consistency estimates of the items by using Cronbach's alpha also demonstrated that all three dimensions (DEV=0.92; UND=0.83; ENC=0.88) and all the items (0.93) in the FFPS had high

internal consistency, indicating that FFPS generates reliable scores. Overall, it can be concluded that FFPS is a valid and reliable measure composed of three important dimensions essential to the investigation of formative feedback perceptions in project-related higher education courses.

The use of multiple approaches, specifically exploratory sequential design, can be considered a rigorous and systematic method because it enables the use of multiple forms of validity and reliability in order to qualitatively and quantitatively explore the multi-dimensions of formative feedback perceptions from the views of individuals in the population. It is not possible or sufficient just to present insights into formative feedback as a theoretical construct, by using either just qualitative or quantitative approaches. For that reason, the current study should prove particularly valuable as a means to reveal the dimensions of formative feedback perceptions, and to contribute a new, reliable, and validated research instrument to the collection of assessment and evaluation literature in higher education.

The growing body of research on the perceived value and effects of feedback in performance at the individual level has featured in the literature (Lizzio & Wilson, 2008; Poulos & Mahony, 2008; Price et al., 2010; Weaver, 2006). However, feedback given to individual members of the group or the group as a whole has not yet been extensively explored (Gabelica et al., 2012; London & Sessa, 2006), especially for project-based courses where educational products along with a project report and portfolio are produced by students as a team or group. Considering the operating of feedback in the complexity of group dynamics and the failing of conventional and standardised instruments to measure feedback on team-based projects from the students' point of view, this scale is a promising tool to be applied to explore and measure students' formative feedback perceptions/experiences on three dimensions, either to individual members or to the group as a whole.

It should be noted that the instrument proposed in the current study has a high applicability not only in science courses alone but also in engineering courses as well. Because, the way students are assessed during design and development of the project in undergraduate engineering courses is akin to the project in undergraduate science courses. Some exemplary engineering courses are documented in literature (Gibson, 2001; Razmov & Vlasseva, 2004) where the course is structured around the project accomplished by small group of students. As in this study, students in referred studies received feedback on their project and written reports in regular project meetings.

## Future Research and Implication for Practice

The findings may have wider application to work-based and experiential learning which can also often involve group work. This would be an interesting avenue of further research. Moreover, given the difficulty of student-teacher interaction especially in large class settings, knowing student's perceptions on feedback might help tutors or instructors steer student learning in a way that

encourages deep approaches to learning. Previous studies highlighted the association of feedback preferences with surface and deep approaches to learning. Further studies are needed to understand how formative feedback perceptions inform or encourage these two learning approaches. In addition, future research is needed to validate and replicate a similar structure of the current scale with a more representative and larger sample from different disciplines, nations and cultures.

## Limitations

Even though this study contributes to the existing knowledge on formative feedback by providing a new multidimensional instrument, there are also certain limitations that are worthy of mention. Firstly, selecting participants from the same department, albeit from four public universities, in order to reveal students' authentic experiences of formative feedback on project courses, may be a limitation to a certain extent in terms of ability to generalise the results of this study to other samples from other departments. In addition, self-reports by the participants during interviews and the completion of questionnaires may also be considered a limitation for the validity and reliability of the results of this study. Therefore, interpretation of the results of the current study should be considered based on these limitations.

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# Appendix

**Turkish and English Versions of the Formative Feedback Perception Scale (FFPS)**

| # | *Turkish* | *English* |
|---|---|---|
| | **Genel olarak, projeme verilen yapılandırıcı dönütler....** | **In general, formative feedback given to my project....** |
| **DEV_1** | … düzeltme sürecinde yol gösterir. | … gives direction during revision process. |
| **DEV_2** | … ayrıntılı olarak nasıl düzeltme yapacağımı açıklar. | … explain how to revise in detail. |
| **DEV_3** | … nasıl düzeltme yapacağım ile ilgili temel ipuçları içerir. | … includes basic tips about how to revise. |
| **DEV_4** | … düzeltme gereken yerleri açık şekilde gösterir. | … shows me clearly the place where revision is needed. |
| **DEV_5** | … performansın zayıf yönlerini geliştirmek için yapılması gerekenleri belirtir. | … provides what needs to be done to improve weak sides of performance. |
| **DEV_6** | … bakmam gereken yön hakkında beni yönlendirir. | … gives clues about which direction to look. |
| **DEV_7** | … etkilidir. | … is effective. |
| **DEV_8** | … yapıcıdır. | … is constructive. |
| **DEV_9** | … açıklayıcıdır. | … is well-explained. |
| **DEV_10** | … olumsuz noktaları sebepleriyle beraber verir. | … negative points are given with their justifications. |
| **DEV_11** | … gelecekteki projelerim için faydalıdır. | … helps me in future projects. |
| **UND_1** | … anlaması kolaydır / anlaşılırdır. | … is easy to understand. |
| **UND_2** | … okunması kolaydır (yazılı geri dönüt için). | … is easy to read (for written feedback). |
| **UND_3** | … düzeltmesi kolaydır / pratiktir. | … is easy to revise / practical. |
| **UND_4** | … tutarlıdır / çelişkili değildir. | … is consistent / not contradictory. |
| **UND_5** | … konuya ve soruna uygundur. | … is relevant to the topic and the problem. |
| **UND_6** | … performansın zayıf yönlerine dikkat çeker. | … draw attention to weak sides of performance. |
| **UND_7** | … önceden belirlenmiş değerlendirme ölçütlerini temel alır. | … is given based on the previously defined assessment criteria. |
| **ENC_1** | … yaptığım işe değer verildiğini hissettirir. | … shows that instructor cares about the work I have done. |
| **ENC_2** | … sarfettiğim emeği dikkate alır. | … recognizes the effort I have made. |
| **ENC_3** | … düzeltmeler için beni teşvik eder. | … motivates me to revise. |
| **ENC_4** | … çoğunlukla olumludur. | … is mostly positive. |
| **ENC_5** | … olumsuz şeyleri olumlu şekilde sunar. | … presents negative things in a positive way. |
| **ENC_6** | … tonu ve yaklaşımı olumludur. | … has positive tone and manner. |
| **ENC_7** | … olumlu ile eleştirel arası dengelidir. | … has a balance between critical and positive. |

* **DEV:** Development; **UND:** Understandability; **UNC:** Encouragement.

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# Opinions of Teacher Candidates on Mentor Teacher Program (Example of Muğla)*

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## Abstract

It is a fact that most newly appointed teacher candidates have problems in respect of personal, social and professional matters. Especially, the inadequacy of theoretical information in practice increases the problems experienced by teacher candidates during the first years when they start the profession. Mentorship, defined as guidance provided by a more experienced and knowledgeable person to another who is beginning his/her profession, may be suggested to help solve professional and organizational problems faced by beginning teacher candidates and help them settle in the profession and organization. The present study aims to identify the contribution to the professional skills of the newly appointed teachers of the National Education of their activities conducted in class with their mentor teachers for 24 weeks, and the views of teacher candidates on such implementation. The study group consists of 50 teacher candidates from Menteşe district of Muğla. The study group was selected by maximum diversity sampling method. Data was collected using open-ended questions. The study participants were asked some open-ended questions to collect detailed data on the mentor teacher program implemented for teacher candidates. According to the findings, the majority of the teacher candidates finds the mentorship implementation helpful and wants it to continue after some reforms. Also, personal qualities required of a mentor, as the participants described, are being understanding, showing empathy, being good-humored, having good faith and being kind, while professional qualities required of a mentor, again as the participants described, are having seniority, being knowledgeable in pedagogics and being open to new ideas. A review of the views of the teacher candidates as to what should be done to improve the mentorship implementation shows that, first, the forms should be reduced in the process, that the implementation should be conducted where they are appointed and that the implementation atmosphere should be more free.

***Keywords:*** mentor teacher, mentor qualities, teacher candidates

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# Aday Öğretmenlerin Danışman Öğretmenlik Uygulamasına İlişkin Görüşleri (Muğla İli Örneği)

## Öz

Mesleğe yeni atanan aday öğretmenlerin birçoğunun bireysel, sosyal ve mesleki konularda sorun yaşadığı bilinen bir gerçektir. Özellikle öğrenilen teorik bilgilerin uygulamada boyutunda yetersiz kalması aday öğretmenlerin mesleğe başladıkları ilk yıllarda yaşadıkları sorunları artırmaktadır. Alanında daha deneyimli ve bilgili kişinin yeni başlayan kişilere rehberlik etmesi olarak tanımlanan mentörlüğün mesleğe yeni başlayan aday öğretmenlerin yaşadığı mesleki ve örgütsel sorunların çözümünde ve adayın mesleğe ve örgüte uyumunda yardımcı olacağı söylenebilir. Bu çalışmanın amacı Milli eğitimin yeni atanan aday öğretmenlerin 24 hafta boyunca sınıfta danışman öğretmenleriyle uygulayacakları etkinliklerin aday öğretmenlerin mesleki becerilerine yaptığı katkıyı ve aday öğretmenlerin bu uygulama ile ilgili görüşlerini ortaya çıkarmaktır. Araştırmanın çalışma grubunun, Muğla Menteşe ilçesinde aday öğretmen olarak bulunan 50 öğretmen oluşturmaktadır. Araştırmada, çalışma grubu amaçlı örnekleme yöntemlerinden maksimum çeşitlilik örneklemesi ile belirlenmiştir. Araştırmanın verileri açık uçlu sorular ile toplanmıştır. Bu araştırmada katılımcılara açık uçlu sorular sorularak öğretmen adaylarının danışman öğretmen uygulamasına ilişkin detaylı verilere ulaşmak amaçlanmıştır. Araştırma bulgularına göre aday öğretmenlerin birçoğu, mentörlük uygulamasının yararlı olduğunu düşünmekte, bu uygulamanın bir takım düzeltmelerle devam etmesini istemekte ve uygulama sürecinde özellikle mentör seçiminin önemine vurgu yapmaktadır. Mentörde olması gereken kişisel özellikler anlayışlı olma, empati yapabilme, güler yüzlü olma, iyi niyetli olma ve kibar olma şeklinde ifade edilirken mesleki özellikler kıdemli olma, pedagojik açıdan bilgili olma ve yeniliklere açık olma şeklinde ifade edilmiştir. Aday öğretmenlerin mentörlük uygulamasının daha iyi olması için neler yapılması gerektiğine ilişkin görüşleri incelendiğinde adayların öncelikli olarak süreç içerisinde yer alan formların azaltılmasını, uygulamanın atanılan yerde yapılması gerektiğini ve uygulama ortamının daha özgür olması gerektiğini ifade ettikleri görülmektedir.

***Anahtar Sözcükler:*** mentor öğretmen, mentör özellikleri, öğretmen adayları

## Introduction

It is a fact that most newly appointed teacher candidates have problems in respect of personal, social and professional matters. Especially, the inadequacy of theoretical information in practice increases the problems experienced by teacher candidates during the first years when they start the profession. In order to alleviate such problems, the Ministry of National Education (MoNE) planned a training process for teacher candidates and published a directive on March 2, 2016 after amending the teacher candidate training process.

The purpose of this directive is to regulate the procedures and principles for the training process of teacher candidates appointed to public educational institutions under the Ministry of National Education. According to the directive, teachers carry out class, school and out of school activities and participate in in-service educational activities under the training program. During the training, teacher candidates are not assigned independent class and duty work. Teacher candidates attend classes under the supervision of a mentor teacher and accompany their mentors to observe them while they are on duty (Article 5). The directive defines the concept of "mentor teacher" as a teacher "who mentors teacher candidates during the candidate training process". The duties of a mentor teacher is provided in the directive as follows: "a) Preparing the teacher candidate's work program with the administrator of the educational institution, b) Helping the teacher candidate carry out the activities set forth in the work program and taking necessary measures, c) Monitoring, assessing and guiding teacher candidates to ensure their training according to the work programs, cc) Setting an example for teacher candidates with their professional knowledge, skills, attitude and behavior and sharing their experiences with them, d) Performing other duties as assigned by the administrator of the educational institution" (Article 12). Similarly, the 19th National Education Council also adopted some decisions on the mentor teaching program. According to such decisions, "It is believed that there is a need for more structured practice-based models by mentor teachers who possess the required education and experience during the training of teacher candidates within the institution and the system after their admission to the profession. With respect to the re-structuring of the candidacy process of teacher candidates, teacher candidates must be placed in schools and institutions where they train and complete their candidacy process under the supervision of mentor teachers without being tenured" (www.meb.gov.tr). As seen, mentor/advisor teacher implementation is used synonymously with mentorship and decisions were adopted recommending the implementation of the mentorship program. Therefore, according to the directive, mentor teachers are expected to set an example for teacher candidates and participate in the preparation of a work program for teacher candidates during the training. In such case, the "mentor teacher" implementation in the directive can be considered under the scope of mentorship. Accordingly, the following sections of the present study will use the term mentor to refer to mentor teachers.

In recent years, mentorship providing support to beginning teachers (Hobson, Ashby, Malderez & Tomlinson, 2009) is a complex process that involves guiding,

teaching, influencing and supporting the beginning teachers (Koki, 1997; Özcan & Çağlar, 2013; Kemmis, Heikkinen, Fransson, Aspfors & Edward-Groves, 2014). The term mentor that was first used by Homer means `wise and trusted guide` (Bakioğlu & Hacıfazlıoğlu, 2000). An investigation of the literature shows that there are several definitions of mentorship. While Kuzu, Kahraman &Odabaşı (2012), and Kram (1985) defines mentorship as the support provided by a more experienced and knowledgeable person (mentor) to a less experienced person (mentee), Daresh (2003) defines it as a process of willingly transmitting experiences to people who need such experiences. According to this, mentorship may be defined as guidance provided by someone more experienced and knowledgeable in an area to people who are new in a profession.

The mentorship process may be suggested to help beginning teacher candidates with the solution of professional and organizational problems they face and their orientation with the profession and the organization (Yarrow & Millwater, 1997; Sezgin, Koşar & Emre, 2014). At this point, the mentorship involves a process where the mentor teacher communicates school policies and processes to and shares teaching methods, materials and other resources with teacher candidates, helps them with the solution of problems faced during learning and teaching, provides professional and personal support to teacher candidates and guides the development process of the teacher candidates (Feiman-Nemser & Parker, 1992).

Mentorship in education goes hand in hand with the concepts of taking someone as a role model and coaching. Although they seem similar to each other, there are some differences. To take someone as a role model is to take someone as an example. At this point one of the functions of mentorship is setting a positive model. In coaching, a teacher supports another teacher in their development in professional matters such as teaching skills and techniques. If mentorship is intended for beginning teachers, coaching is an important part of the mentorship process (Koki, 1997). While mentorship takes the values and vision of the organization into consideration, coaching seeks to combine the values of the individual with the values of the organization (Aydın, 2007). As seen, mentorship is a process that involves taking someone as a role model and coaching and contributes not only to the individual, but also to the organization.

Although the mentorship process contributes to the individual and the organization, it also brings some advantages and disadvantages together. Accordingly, mentorship alleviates the teacher's feeling of loneliness, heightens their feeling of trust and self-respect and improves their skills of class and time management, as well as teaching them to overcome the workload and helping with their problem solving skills (Yarrow & Millwater, 1997; Devos, 2010). Besides, from the organization perspective, it allows school employees to know each other better, which leads to increased cooperation and job satisfaction and creates an organization climate supporting professional development and participation in the school (Hobson, Ashby, Malderez, &Tomlinson, 2009). While mentorship contributes to employees' personal and professional development (Lyons, Scroggins

& Rule, 1990), it also enhances the communication and increases the cooperation and trust between the colleagues (Rhodes, Stokes & Hampton, 2004). The mentorship process also improves the leadership and communication skills of mentors, helps them gain a critical perspective, increases their job satisfaction and makes them realize their own learning experiences. For mentees, the mentorship process develops their professional and organizational skills, helps them learn how to accept criticism, contributes to the development of a feeling of autonomy and independence and develops their learning and analytical thinking skills. For the organization, the mentorship process increases the trust within the organization, supports personal development and increases the job satisfaction and performance of employees (McKimm, Jolie & Hatter, 2007).

However, the mentorship process sometimes can cause the workload to become uncontrollable and adversely affects the mentor's live due to the stress it causes, and some mentors fail to provide emotional and psychological support to teacher candidates and support teacher candidates (Hobson, Ashby, Malderez, & Tomlinson, 2009). This situation has led to the question of what qualities mentors must possess. According to this, a good mentor must first accept to be a mentor. Later, he/she must be a good listener, must not be judgmental, and must show empathy, provide feedback, have a sense of humor, and be accessible, trustworthy and experienced (McKimm, Jolie & Hatter, 2007).

Mentorship is an important process for beginning teacher candidates. For, a teacher candidate enters a phase where he/she will utilize the theoretical knowledge he/she has learned so far, and tries to familiarize himself/herself with an educational organization and learn about the relationships within the organization and learn the learning and teaching process. At this point, the teacher candidate is faced with emotional, professional and personal problems. "The mentor teacher" status put into effect by the last amendment is expected to help the teacher candidates overcome such problems. In other words, the advising teacher, in a sense, serves as a mentor. A review of the literature shows that there are research suggesting that mentorship contributes to the training of teacher candidates (Kocabaş & Yirci, 2011; Bozok, Yıldırım & Demirtaş, 2011, Aslan & Öcal, 2012; Mastapha, 2011; Pinkston, 2008; Mordan, 2012). However, these studies focus on the contributions of mentorship, emphasize its importance for teacher training, mention about the mentor role of the school administrators in the training of teacher candidates, and present the views of teachers and administrators on the matter. Whereas, it is believed important to discover the views of the teachers candidates who are faced with problems and need support during the implementation introduced with the concept of "mentor teacher" for the training of teacher candidates so that such views might bring about a different perspective for the process of teacher training and shed light on the expectations of teacher candidates who need development and support.

The present study aims to identify the contribution to the professional skills of the newly appointed teachers of the Ministry of National Education of their activities

conducted in class with their mentor teachers for 24 weeks, and the views of teacher candidates on such implementation.

## Method

The phenomenology design, a quantitative research design that fits the nature of the present study, was used. This design aims to discover the individua perceptions or perspectives regarding a specific phenomenon (Patton, 2002; Yıldırım & Şimşek, 2008).

### Research Sample

The study group consists of the teacher candidates situated in Menteşe district of Muğla. There are 89 teacher candidates in Menteşe central district of Muğla. The research data was collected from 52 teachers. 57 teachers candidates situated in Menteşe central district of Muğla completed an open-ended questions form about mentor teacher program. While 52 of the teacher candidates participating in the research completed the form, 5 thereof were not included in the study because they did not complete the form properly. The study group was selected by convenience sampling method. According to Yıldırım & Şimşek (2008), convenience sampling method makes a study fast and practical. Generally, a convenience sample is relatively less costly. The purpose here is to create a relatively small sample. Also, this method seeks to identify whether or not there are common or shared facts and differences among the varying situations in the sample and explore the different dimensions of a problem according to such variation (Yıldırım & Şimşek 2008).

In parallel with the nature of the qualitative research methods, 45 teachers accessed were administered an open-ended questions form on the mentor teacher implementation. The teachers were asked about their subject field and the provinces to which they were appointed. Table 1 shows the teacher candidates' subject fields and the provinces to which they were appointed.

As seen from Table 1, the great majority of the teacher candidates participating in the study are English language teachers (27.78%). Other subject fields are, in respective order, primary education teaching (25%), counseling (8.3%), health services (8.3%), Science teaching (8.3%) and information technologies teaching (8.3%). 50% of the provinces appointed are eastern provinces and 25% thereof are western provinces. 25% of the teachers participating in the study did not specify the provinces to which they were appointed.

Table 1

*Teacher Candidates Subject Fields and the Provinces*

| | | n | % |
|---|---|---|---|
| Subject Fields | Health Services | 3 | |
| | Primary Education Mathematics | 2 | |
| | Pre-School Teaching | 2 | |
| | Primary Education Teaching | 11 | |
| | Science Teaching | 4 | |
| | Information Technologies | 3 | |
| | Counseling | 6 | |
| | Literature | 1 | |
| | English | 12 | |
| | German | 1 | |
| | Total | 45 | |
| Provinces appointed | Eastern Provinces | 22 | |
| | Western Provinces | 13 | |
| | Not Specified | 10 | |
| | Total | 45 | |
| Not Specified | | 7 | |
| | Grand Total | 52 | 100% |

## Data Collection Process

The data collection technique used herein is the open-ended questionnaire. The views of the teacher candidates in Muğla on the mentor teacher implementation are explored by achieving the sub-unit of the open-ended questions form developed by the researchers. The form consists of seven questions. The questions were prepared based on the Regulation of the Ministry of National Education on Teacher Appointments and Reassignments published in the Official Gazette Issue no. 29329 of April 17, 2015 regarding the mentor teacher program. The questions were finalized in line with the opinions of two experts in the field of education science and a preliminary application was conducted. During the preliminary application, one teacher candidate not included in the participant teacher candidate group was asked the questions in the form in order to assess how clear and answerable the questions were.

## Data Analysis

Data analysis was performed by adopting two different approaches. Accordingly, since the topics had been pre-defined, descriptive analysis method was used mostly, while content analysis method was also used to identify the codes under the main topics. Yıldırım and Şimşek (2008) suggested that the views of the individuals interviewed or observed might often be quoted directly in descriptive

analyses to reflect their views in a striking manner. The present study also quoted the responses of the participating teachers to reveal their views objectively. Care was used to ensure that the researchers mutually agreed on the comments and codings regarding the data. As for the evaluation of the questions, some expressions by the teachers were included, and the main points shared by such expressions were investigated in view of their frequency and percentage. Also, codes were used while tabulating the data (T1, T2, T3...).

### Validity and Reliability

The intercoder reliability of the themes developed was checked to ensure the internal reliability. The themes were separately coded by the researchers, and the consistency between the codings was compared.

The records of the open-ended questions were coded by two coders. Before the codes, the second coder went through a training process. An external expert (the second coder) trained the second author of the present study (the main coder) in understanding the views of the teacher candidates on mentor teaching easily. During such training process, the second author was taught about the Questions, the duties of a mentor teacher as set forth by the Regulation of the Ministry of National Education on Teacher Appointments and Reassignments published in the Official Gazette Issue no. 29329 of April 17, 2015, and the qualities of a mentor teacher in the literature. When an 80% agreement was achieved between the coders during the training process, the main coder began coding all of the records. The second coder coded 25% of the records. The intercoder reliability was checked by the "Agreement / Agreement + Disagreement X 100" formula (Miles & Huberman, 1994). The study reliability calculated was 83.3%. To ensure the reliability of the study, short and direct quotes were included, and the data collected was grouped and presented to the reader without adding any comment. The findings are interpreted in the discussion section.

## Findings

In this section, the main themes determined based on the main research questions and sub research questions are included as shown in Figure 1. Also, the views of the participants on the mentorship implementation are presented along with their statements under the main themes headline.

There are four main themes in the study: (1) The views of the teacher candidates on the mentorship implementation, (2) the views of the teacher candidates as to whether or not the mentorship implementation should continue, (3) The qualities required of a mentor teacher according to the teacher candidates, (4) The views of the teacher candidates as to what must be done to improve the implementation.

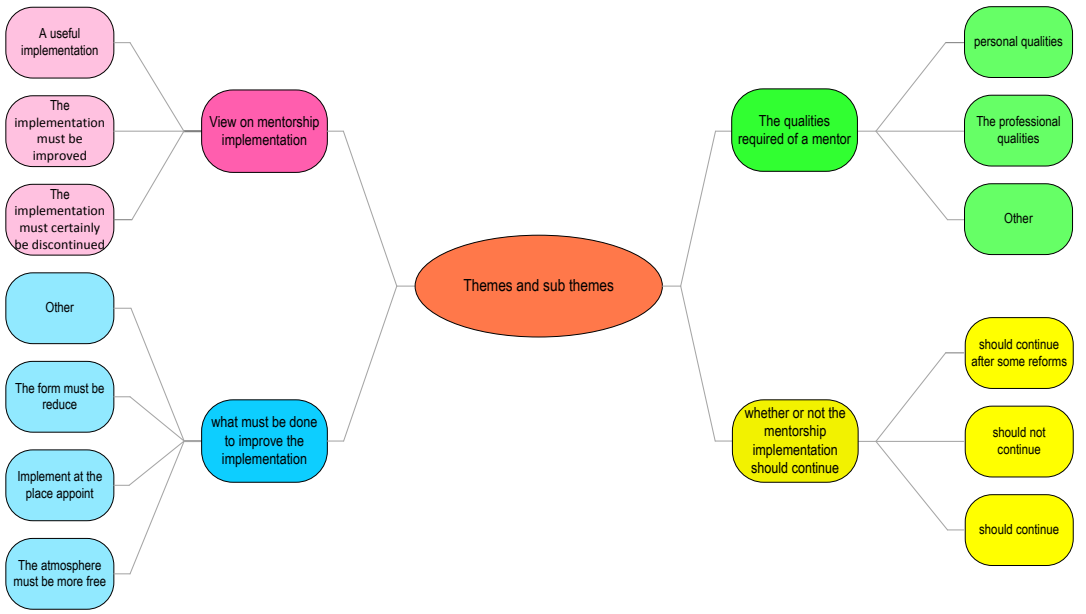


Figure 1

*Main Themes and Sub Themes*

## Findings Regarding the Main Theme of Mentorship Implementation

Under this heading are the findings on the main theme and sub themes determined based on the main research question 1. The participants were asked about their views on mentorship (mentor/advising teacher) implementation, which led to three sub themes under the main theme. Figure 2 shows the frequency of the references made by the participants to these concepts.

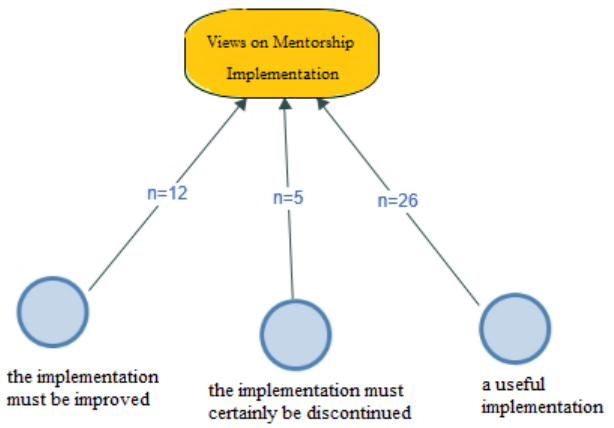


Figure 2

*The Participant Views on Mentorship Implementation*

The participants were asked about their views on the mentorship implementation in the open-ended questions form, and the theme and sub themes were identified based on their views on the implementation. According to the findings, the main theme of views on the mentorship implementation was explored by dividing it into three sub themes, namely 'the implementation must be improved', 'a useful implementation', and 'the implementation must certainly be discontinued'. According to figure 2, 12 participants referred to the sub concept of 'the implementation must be improved', 26 participants refereed to the sub concept of 'a useful implementation', and 4 participants referred to the sub concept of 'the implementation must certainly be discontinued'.

T31 described the sub dimension of 'the implementation must be improved' as follows;

> *"I think that the implementation should definitely continue. However, we teacher candidates must also be asked about our views by such surveys and interviews during the process..."* (T31)

Some participants stated that the implementation was useful, but argued that it should be improved in terms of the administrative matters and the mentor teacher. For example, T10 and T11 expressed their views as follows.

> *"A useful implementation. However, it is a new implementation and I believe there are some opportunities (room for improvement)."* (T10)

> *"I think it is a useful implementation. However, the system has yet to settle, and therefore there are some major flaws."* (T11)

The number the teachers finding the implementation useful are more in comparison to the other sub dimensions. The teachers of this view in general used the concepts such as productive, useful, great and helpful for the implementation.

> *"I consider the mentor teacher program to be an important one, I think it is useful..."* (T22)

> *"I think it is a productive implementation."* (T23)

> *"I find the mentor teacher implementation agreeable. Especially, it is great to practice at a place of our choosing..."* (T1)

The teachers who described the implementation as useless used very definitive expressions.

> *"I think it is an unproductive process. One learns with experiences. You cannot adopt and embrace the students because a set of eyes is constantly watching you. You cannot speak properly and be genuine. Students cannot embrace you, either. You have to fill tons of forms, which, I believe, is very unnecessary."* (T27)

> *"I think it is a useless implementation. It was done in the past, too. It is not a new implementation."* (T30)

*"……..I find teacher candidacy nonsensical, let alone mentor teaching. We have already been sufficiently trained in the faculty of education."* (T33)

*"I don't find this implementation useful ....."* (T4)

## Findings Regarding the Main Theme of Whether or not Mentorship Implementation Should Continue

According to the responses of the teacher candidates to the question whether or not the mentorship implementation should continue, three sub themes were identified including 'should continue', 'should not continue', and 'should continue after some reforms'. Figure 3 shows the frequency of the references made by the participants to these concepts.

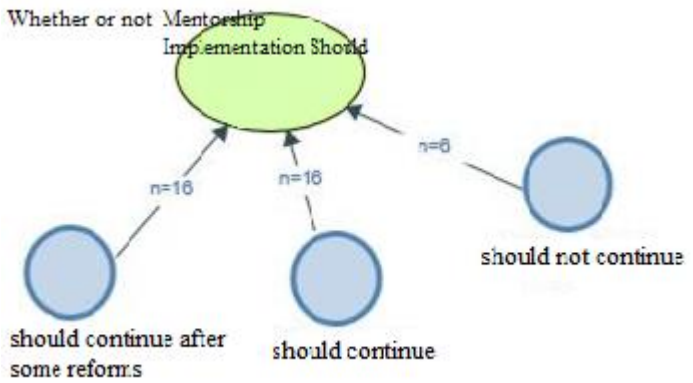


Figure 3

*View on Whether or not Mentorship Implementation Should Continue*

16 of the participating candidate teachers argued that the implementation should continue, while 16 thereof argued that it should continue after some reforms and 6 thereof argued that it should not continue.

The teachers who wanted the implementation to continue generally argued that the implementation's return for them was experience, and therefore that it should continue.

*"It should continue. The teacher candidates must be given the option to replace their mentor teachers. The teacher candidate must be paid additional teaching remuneration."* (T37)

*"Yes. It should be in place to see a school atmosphere, observe relationships and get over the apprenticeship. However, I think that there is too much dependent on the mentor in the program."* (T1)

*"Yes, it should continue because a teacher candidate learns from a mentor teacher how to prepare for a class and adjust and teach according to the class level."* (T14)

The teacher candidates who did not want the implementation to continue generally referred to the problems arising from the mentor teacher.

> *"No, it should not continue. My mentor teacher is good, but another friend suffers greatly from his/hers. Also, there is the form burden, of course. That's why it shouldn't continue. Let's just go to the provinces we are appointed to and start doing our time at once."* (T3)

> *"No, because I think it would be more useful if we went to our assigned places and settle in at once."* (T4)

The teacher candidates who wanted the implementation to continue with some reforms;

> *"It should continue after further supplementing it and remedying some shortfalls."* (T22)

> *"It should continue, but the teacher candidates must be given the option to replace their mentor teacher. Also, the teacher candidate must be paid additional teaching remuneration."* (T23)

> *"Yes, but we should intern where we are appointed. It is necessary to get over the apprenticeship."* (T11).

> *"Yes, but no in its current state. However, if we started where we are appointed and if it functioned in a more planned manner, then it should continue."* (T13)

**Finding Regarding the Main Theme of Qualities Required of a Mentor Teacher**

According to the responses of the teacher candidates to the question regarding the qualities required of a mentor teacher, three sub themes were identified including professional qualities, personal qualities and other. Figure 4 shows the frequency of the references made by the participants to these concepts.

The sub themes personal qualities and individual qualities have also their own sub themes. Accordingly, the teacher candidates defined the personal qualities required of a mentor teacher as being understanding (n=8), showing empathy (n=4), being good-humored (n=3), having good faith (n=6), and being kind (n=2). The teacher candidates listed the professional qualities required of a mentor teacher as having seniority (n=13), being knowledgeable in pedagogics (n=6) and being open to new ideas (n=8).

The teacher candidates described the personal qualities of a mentor teacher as follows.

> "*He/she must be understanding and must remember that we are teachers, too."* (T28)

*".....He/she should not try to put pressure, should motivate us when we are before the students, and should criticize by toning down."* (T32)

*"A mentor teacher should be helping and sharing, should not have a selfish personality."* (T1)
*"They should be patient and good humored toward candidates."* (T5)

*"They should have good faith and should not try to burden the teacher candidate with their own private chores."* (T37)

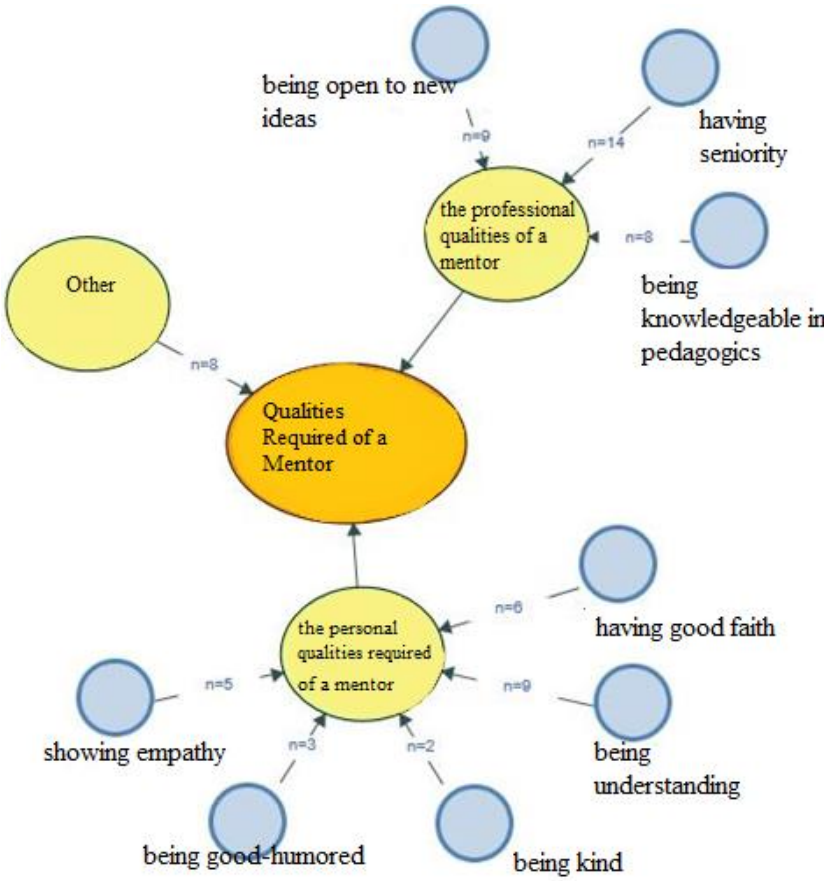


Figure 4

*Qualities Required of a Mentor Teacher According to the Participants*

The teacher candidates described the professional qualities of a mentor teacher as follows.

*"They should be experienced and decide based on the perceptible observations as to whether or not the candidate has progressed in terms of behavior in the school."* (T1)

*"They must be competent at transmitting their experiences. They must be enthusiastic, remember that the candidate is their colleague and approach accordingly."* (T10)

*"They must be experienced, and working and supporting without any materialistic expectation."* (T15)

*"A teacher assigned as a mentor must develop himself/herself continuously."* (T5)

## Findings Regarding the Main Theme of What Should Be Done to Improve the Implementation

The teacher candidates were asked about what should be done to improve the Implementation, and four sub themes were derived based on their responses. These themes are grouped as follows: implementation at the place appointed (n=5), reducing the forms (n=27), implementation in a free atmosphere (n=8) and other (n=13). Figure 5 shows the frequency of the references made by the participants to these concepts.

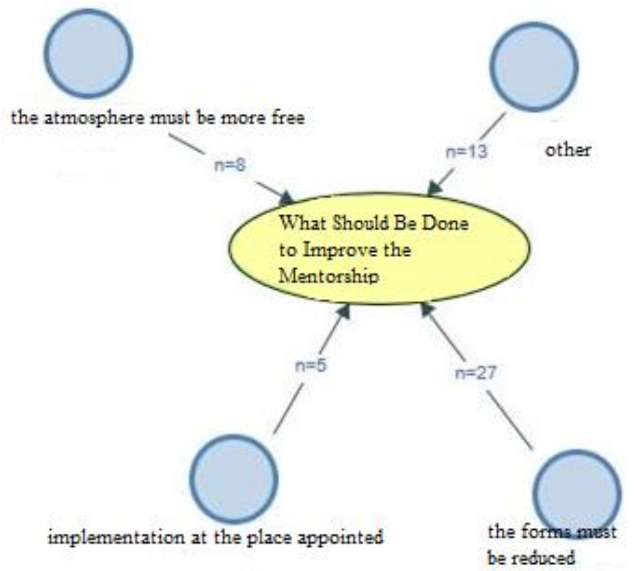


Figure 5

What Should Be Done to Improve the Mentorship Implementation According to the Participants

The sub dimension referred to the most in the main theme regarding what should be done to improve the implementation is 'the forms must be reduced'. In this sub dimension the teacher candidates stated that the forms were unnecessary waste of time, that the documentation load was very heavy and that they were unable to focus on their essential work because of it.

*"That many forms should not be filled. A form after each class and 9 forms a week, it is drudgery. Think about it; one takes great pains to complete them. Also, a teacher's style of teaching is always the same, what else could I write in there."* (T38)

*"Also, there is the form burden, of course. That's why it shouldn't continue. Let's just go to the province we are appointed to and start doing our time at once."* (T39)

*"It helps you gain experience, but the documentation chore is heavy and should be addressed."* (T12)

Besides, some teacher candidates argued that the atmosphere must be more free.

*"It could use a little more free atmosphere. We sometimes feel a lot of pressure. It should take place in a more free atmosphere."* (T40)

*"It should take place in a more free atmosphere."* (T26)

## Conclusion and Suggestions

The present study sought to discover the views of the teacher candidates on the mentorship implementation. The views of the teacher candidates was dealt with under four main themes including the mentorship implementation, whether or not the mentorship implementation should continue, the qualities required of a mentor teacher and what should be done to improve the implementation.

An examination of the views of the teacher candidates on the mentorship implementation shows that about half the teachers find it useful while some think that it should be improved. Few participants stated that the implementation should be discontinued. Similarly, Karadağ's (2015) study also revealed that the teachers found the mentorship process useful. A review of the literature suggests that the mentorship implementation contributes to an individual's personal and professional development and helps create a positive school climate (Karadağ, 2015; Çelik, 2011; Yarrow & Millwater, 1997; Aslan & Öcal, 2012). Arnold-Rogers, Arnett and Harris (2008) and Zientek (2007) discovered during their studies that the mentorship was useful during the first years of teaching and developed the relationship between the colleagues. In this case, the mentorship is apparently useful. However, some participants find it useless and especially think that the forms completed during the process are unnecessary. Similarly, Ulubey (2016) found that, teacher candidates think that the program was positive, but think that forms filled in the program had to be reduced or eliminated. The reason for that may be the heavy workload of the teachers and the reluctance of the participants to participate in the process. Hence, some research discovered that the teachers who found the implementation useless were reluctant to participate in the process (Karadağ, 2015; Aspfors & Fransson, 2015) and had difficulty taking the time due to their workload (Karadağ, 2015).

A review of the views of the teacher candidates as to whether or not the mentorship implementation should continue shows that the majority wanted it either to continue or continue with some reforms. The participants think that the implementation serves as an experience for them, but that they must have the option to choose their mentor teacher. The option to choose a mentor is considered an important stage of the process (Karadağ, 2015; Eby & Lockwood, 2005). For, choosing a mentor constitutes the basis of a mutual trust and voluntary action in the process. A mentorship relationship built upon such basis will contribute a lot more. Also, the participants stated that it would be more helpful if the implementation was conducted where they were appointed. With regard to this matter, some participants pointed to some problems arising from the mentors and stated that the implementation should not continue. At this point, the qualities of the mentor appear to be important.

The views of the teacher candidates on the qualities required of a mentor are grouped under the headings of personal and professional qualities. Personal qualities required of a mentor, as the participants described, are being understanding, showing empathy, being good-humored, having good faith and being kind, while professional qualities required of a mentor, again as the participants described, are having seniority, being knowledgeable in pedagogics and being open to new ideas. A review of the literature shows that a good mentor must show empathy, must not be judgmental, must be open minded, must have a sense of humor, must be supportive, and must have professional experience (McKimm, Jollie & Hatter, 2007). Colins (1983; as cited by Esas, 2013) suggests that a mentor must put himself/herself in someone else's place, must be a good listener and must be constructive. Again. Some research emphasized the importance for a mentor to show empathy and realize the needs of the person before him/her (Beutel & Spooner-Lane, 2009; Sinclair, 2003; Tang & Choi, 2005).

A review of the views of the teacher candidates as to what should be done to improve the mentorship implementation shows that, first, the forms should be reduced in the process, that the implementation should be conducted where they are appointed and that the implementation atmosphere should be more free. Especially, they think that form completion takes a lot of time, and regard it as a workload and drudgery.

In conclusion, the majority of the teacher candidates finds the mentorship implementation useful, want it to continue with some reforms and emphasize the importance of the ability to choose one’s own mentor. Accordingly, it may help solve the problems if the implementation’s shortfalls are reviewed, the candidates are given the option to choose their own mentor, the workload of the process is reduced and the mentors are selected among the persons fit for this task. However, if the implementation is to be carried out at their appointment places, it will allow them to better learn about the place they will work at as teachers and approach more positively to the problems experienced there. The present study investigated the views of the teacher candidates in Muğla on the mentorship program. It is believed

important if future research focus on the view of the mentors participating in the process and discovering any common problems by conducting studies in different provinces.

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# Analysis of the Changes in Prospective Secondary Mathematics Teachers' Knowledge of Lesson Plan

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## Abstract

The purpose of this study is to investigate how prospective mathematics teachers' develop their knowledge of mathematics lesson plan in a Teaching methods course. We conducted this qualitative study with eight prospective secondary mathematics teachers studying at at a state university in Turkey. We have collected during the course of "Teaching methods in mathematics education". We have asked questions about planning mathematics lessons to 60 prospective teachers at the beginning of the course. We have individually interviewed with eight prospective teachers. The prospective teachers prepared lesson plans in pairs based on the acquisition in the curriculum that was provided by the instructor of the course. After the Teaching methods course, we again interviewed these prospective teachers with their peers whom they prepared their lesson plans with. In beginning of the course, some of the prospective mathematics teachers confused mathematics lessons plan with mathematics curriculum. We have explored two categories at the beginning of the course: knowledge of components in lesson plans and knowledge of students' motivation and understandings. The knowledge of teachers' self-assessment is the other category, which evolved from the data at the end of the course. We have found that prospective secondary mathematics teachers' knowledge of mathematics lesson plans change from structural level to instructional level. In the beginning of the course, the prospective teachers mentioned sections of a lesson plan, elements of teaching process, and classroom context. After the course, they gave detailed information about how to organize an instructional process considering students' motivation and understandings. The prospective teachers also put the acquisitions in center of the lesson plan. They had never referred mathematical content before they took the course. However they realized the importance of their own mathematical content knowledge while designing a plan.

***Keywords:*** pedagogical content knowledge, prospective mathematics teachers, mathematics education, secondary level, lesson plan

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# Ortaöğretim Matematik Öğretmen Adaylarının Ders Planı Bilgilerindeki Değişimin Analizi

## Öz

Bu araştırmada, ortaöğretim matematik öğretmen adaylarının "Özel öğretim yöntemleri" dersinde matematik ders planı bilgilerini nasıl geliştirdiklerini incelemek amaçlanmıştır. Bu nitel araştırma Türkiye'deki bir devlet üniversitesinin beş yıllık matematik öğretmenliği programına devam etmekte olan sekiz öğretmen adayı ile gerçekleştirilmiştir. Araştırmanın verileri katılımcıların eğitimlerinin sekizinci döneminde aldıkları "Özel öğretim yöntemleri" dersinde toplanmıştır. Dersin başlangıcında toplam 60 öğretmen adayına matematik dersini planlama ile ilgili sorular yöneltilmiştir. Araştırmacılar katılımcıları belirlemek için öğretmen adaylarının cevaplarını analiz etmişlerdir. Belirlenen sekiz öğretmen adayıyla bireysel görüşmeler yapılmıştır. Bu ders boyunca öğretmen adayları ikişerli gruplar halinde, dersin yürütücüsünün belirlediği ve öğretim programında yer alan kazanımlar doğrultusunda ders planları hazırlamışlardır. Öğretim yöntemleri dersinin sonunda ders planlarını ikişerli hazırlayan öğretmen adayları ile görüşmeler yapılmıştır. Elde edilen bulgular ışığında dersin başında, bazı öğretmen adaylarının matematik ders planı ile öğretim programı arasındaki farkları ayırt edemedikleri görülmüştür. Dersin başında öğretmen adaylarının ders planı bileşenleri bilgisi ile öğrencilerin anlamaları ve motivasyonları bilgisine sahip oldukları belirlenmiştir. Dersin bitiminde ise öğretmenin kendini değerlendirme bilgisi yeni bir kategori olarak ortaya çıkmıştır. Öğretmen adaylarının ders planı bilgilerinin yapısal düzeyden öğretimsel düzeye dönüştüğü görülmüştür. Özel öğretim yöntemleri dersinin başında öğretmen adaylarının bir ders planın bölümleri, öğretim sürecinin elemanları ve sınıf ortamından bahsettikleri belirlenmiştir. Dersin sonunda ise öğrencilerin anlamaları ve motivasyonlarını göz önünde bulundurarak öğretimsel süreci nasıl organize edeceklerine dair detaylı açıklamalarda bulunmuşlardır. Öğretmen adayları ayrıca kazanımları, ders planının merkezine yerleştirmişlerdir. Öğretim yöntemleri dersini almadan önce matematiksel içerikten bahsetmemişlerdir. Ancak bu dersle birlikte ders planı tasarlarken, kendi matematiksel içerik bilgilerinin önemini fark etmişlerdir.

***Anahtar Sözcükler:*** pedagojik alan bilgisi, ortaöğretim öğretmen adayları, matematik eğitimi, ortaöğretim seviyesi, ders planı

## Introduction

Prospective mathematics teachers often form their ideas on teaching mathematics based on their school experiences in the past, both at K-12 and undergraduate level (Barkatsas & Malone, 2005). Their experiences in Mathematics Teacher Education Programme enable them to obtain new perspectives for both mathematical content and teaching mathematics (Prescott, Bausch, & Bruder, 2013). The content knowledge on its own is not adequate for teaching mathematics in an effective manner, it is also important to examine the way mathematics are taught (Ball, Hill, & Bass, 2005; Shulman, 1986).

The studies focusing on teachers' knowledge are mostly based on the works of Shulman (1986, 1987). Shulman's (1987) theory for knowledge of teaching consists of subject matter knowledge, general pedagogical knowledge, and pedagogical content knowledge, which he defines as "a special amalgam of content and pedagogy that is uniquely the province of teachers, their own special form of professional understanding" (p. 8). Most scholars and policy makers agree on Shulman's pedagogical content knowledge in that it has an important contribution to teaching and learning mathematics (Hill, Ball, & Schilling, 2008). How to teach mathematical content and understand students' way of thinking have been an issue for pedagogical content knowledge (An, Kulm, & Wu, 2004). Many researchers have been inspired by Shulman's (1986, 1987) pedagogical content knowledge conceptions in mathematics education (Baumert et al., 2010; Hill et al., 2008; Tatto et al., 2008). For example, Baumert et al. (2010), within the scope of COACTIV (Professional Competence of Teachers, Cognitively Activating Instruction and the Development of Students' Mathematical Literacy) have examined pedagogical content knowledge into three subcategories, including; (i) knowledge of mathematical tasks, (ii) knowledge of students' thinking and assessment, and (iii) knowledge of multiple representations and explanations of mathematical problems. The International Association for the Evaluation of Educational Achievement (IEA) has questioned the differences among mathematics teacher education programmes. They have also investigated the effectiveness of these programmes. This international comparative study is called as "Teacher Education and Development Study – Learning to Teach Mathematics (TEDS-M)", in the literature (Tatto et al., 2008). TEDS-M has explained knowledge for teaching mathematics through two conceptions, which are (i) mathematics content knowledge, and (ii) mathematics pedagogical content knowledge. Researchers from University of Michigan have also produced another conceptual framework. As described by Hill et al. (2008); mathematical knowledge for teaching comprises of subject matter knowledge, and pedagogical content knowledge. The subject matter knowledge consists of common content knowledge, specialized content knowledge, and knowledge at the mathematical horizon. The subcategories of pedagogical content knowledge include knowledge of content and students, knowledge of content and teaching, and knowledge of curriculum. In our study, while analyzing the first experiences of the prospective mathematics teachers on preparing a lesson plan, we have taken the related literature into account.

Understanding and having knowledge on (i) mathematics, (ii) students and, (iii) pedagogical strategies may influence the effectiveness of the teaching (NCTM, 2000). Preparing a mathematical lesson plan is necessary for an effective teaching. The knowledge required for designing a proper mathematics lesson is one of the components of pedagogical content knowledge (Prescott et al., 2013). The main reason why a lesson plan is prepared is to ensure the efficiency of the lesson and to make the lesson effective in the given time (Gall & Acheson, 2011). Preparing a lesson plan also has an influence on students' getting meaningful learning opportunities. Lesson plans help us document our ideas on teaching and share and/or use them after adjusting them to students and environment for the upcoming years. In short, lesson planning forms the instruction, which teachers design for implementation (Ozogul & Sullivan, 2009). In the classroom, teachers might face with a variety of challenges. Lesson planning has the potential to help the implementation of instruction despite these challenging situations (Akyuz, Dixon, & Stephan, 2011). It is known that lesson planning could not demonstrate all aspects of pedagogical content knowledge (Chick & Pierce, 2008). This kind of knowledge has a critical role, especially for the prospective mathematics teachers who are at the beginning of their professional career. However, the literature has paid only little attention to knowledge of lesson planning. It is of importance for both prospective teachers and their educators to realize what prospective teachers gain from the courses related to the mathematics teaching and learning. We believe that the educators of prospective teachers must shed light on constructing knowledge of lesson planning. We have focused on prospective mathematics teachers' knowledge of mathematics lesson plans in order to reveal the development of their pedagogical content knowledge in a "Teaching methods in mathematics education" course. Such a course allows prospective teachers to construct their own pedagogical content knowledge and also enables teacher educators to reflect on their lesson planning process (Rusznyak & Walton, 2011). Lastly, we have formulated our research question as: In what ways the prospective secondary mathematics teachers develop their knowledge on preparing a lesson plan in a "Teaching methods in mathematics education" course?

## Method

### Participants

We conducted this qualitative study with eight prospective secondary mathematics teachers studying at a five-year teacher education program at the Secondary Science and Mathematics Education department of a state university in Turkey. The prospective secondary mathematics teachers have completed most of the mathematics content courses such as algebra and geometry. Besides, they have also taken most of the pedagogy courses such as developmental psychology and classroom management. After completing these courses, the prospective teachers have taken technologies and material design, and mathematics teaching courses that include modeling, problem solving, abstraction, generalization, mathematical understanding, nature of mathematics and preparing activities required for teaching mathematics which combines knowledge from mathematics content with pedagogy

courses. While coding the raw data, we have assigned each participant a number from 1 to 8. We have coded each prospective teacher as $PT_x$. Here, X refers to the number we have assigned to each prospective teacher.

## Data Collecting Process

We have collected data from the prospective secondary mathematics teachers during the course of "Teaching methods in mathematics education", which was taken during their 8th semester. Firstly, we have asked 60 prospective mathematics teachers to put forward their ideas on planning mathematics lessons at the beginning of the course. Table 1 displays the questions in the survey:

Table 1

*The Questions that We Asked at the Beginning of the Course*

| |
|---|
| 1. What comes to your mind when you think about a lesson plan? |
| 2. Have you ever examined a lesson plan before? If you have, could you write about your observations regarding the lesson plan? |
| 3. What are the things that a lesson plan must contain, in your opinion? |
| 4. Is it necessary and/or important for you to prepare a lesson plan? |
| 5. How do you think a lesson plan should be prepared? |

We analyzed the answers of 60 prospective mathematics teachers in order to select the participants. The reason why eight participants were selected was because they provided us with rich data by writing their ideas in a detailed way. Then, we have individually interviewed these prospective teachers and asked them to clarify their answers written in the survey. The video typed interviews, which were conducted before the Teaching methods course; have approximately taken 15 minutes for each participant.

The instructor of "Teaching methods in mathematics education course" is a professor in mathematics, who has been teaching this course for 10 years. The course, which lasted for 14-weeks, was carried out in three stages. The first stage of the course took two weeks. The instructor of the Teaching methods made an introduction to the Turkish secondary mathematics curriculum, the skills the curriculum aims to gain, and how to read and interpret the acquisitions, which are the national standards, in the Turkish curriculum (MoNE, 2013). Then in the second stage, which took two weeks of the course, the instructor informed the prospective teachers about the lesson plan, which included the aim, structure and content of the lesson plan. In the last stage that covers the remaining weeks of the 14-week course, the prospective teachers prepared lesson plans in pairs according to an acquisition selected from the curriculum, and presented their lesson plan in the classroom. The prospective teachers prepared their lesson plans in pairs based on the acquisition in the curriculum that was provided by their instructor. While the prospective teachers presented their lesson plans in groups, other prospective teachers monitored and criticized their contents and structures of the lesson plans.

After the Teaching methods course, we interviewed the participants with their peers whom they prepared their lesson plans with. Table 2 indicates the questions we have asked in the interview. The last videotaped interviews, which were conducted after the Teaching method, have approximately taken 30 minutes for each.

Table 2

*The Questions that We Asked at the End of the Course*

| |
|---|
| 1. Can you discuss the experiences you had during the process of preparing a lesson plan? |
| 2. After the lesson designing experience you have had, what do you think should be included in a lesson plan? What should a lesson plan cover? |
| 3. After the lesson designing experience you have had, how do you think a lesson should be designed? What should you take into consideration while designing a lesson plan? |
| 4. What do you think of the necessity and significance of designing a lesson plan? |

## Data Analysis

The qualitative content data analysis, designed by Auerbach and Silverstein (2003), was adopted while analyzing the data collected throughout the research. Firstly, we have transcribed and read the row data. Considering the pedagogical content knowledge literature, we have highlighted what we have found as relevant. The related data were separated into meaningful units in the first step of coding, as described by Patton (2002). The data were coded and categorized according to these units; moreover the categories were analyzed and interpreted.

## Findings

We have explored two categories for prospective teachers' knowledge of mathematics lesson plans at the beginning of the course. These categories are (i) knowledge of components in lesson plans and (ii) knowledge of students' motivation and understandings. At the end of the course, we determined another category, which is named as "knowledge of teacher's self-assessment" and is different from the two other categories (see Table 3). We will provide further details for these categories in the subsections.

Table 3

*Knowledge of Prospective Secondary Mathematics Teachers on Lesson Plans*

| **Categories** | **Sub-categories at the beginning of the course** | **Sub-categories at the end of the course** |
|---|---|---|
| Knowledge of the components in lesson plans | Structure of the lesson plan sections<br>Structure of teaching process<br>Structure of classroom context | Structure of the lesson plan sections<br>Structure of teaching process<br>Structure of the classroom context<br>Considering curriculum |
| Knowledge of students' motivation and understandings | Motivating students<br>Realizing students' prior knowledge | Motivating students<br>Realizing students' prior knowledge<br>Being aware of students' individual differences<br>Evaluating students' understandings in the process of teaching |
| Knowledge of teacher's self-assessment | | Examining different resources<br>Reviewing teachers' own mathematical content knowledge<br>Using the lesson plan as a guidance |

## Prospective Mathematics Teachers' Knowledge of Lesson Plans at the Beginning of the Course

At the beginning of the Teaching methods course, some of the prospective mathematics teachers confused mathematics lessons plan with mathematics curriculum. They thought that lesson plan and the curriculum could be viewed as the same with minor differences. Also, they declared that a lesson plan was a more detailed version of a curriculum. Here are some of prospective teachers' explanations:

> *$PT_3$: "I think that teachers should plan how to organize acquisitions for a whole session. Lesson plans are elaborative forms of the curriculum. Teachers have to plan both lessons and the whole session. They should firstly make the plan in their minds."*

> *$PT_4$**:** "Lesson plan could be designed for a period or for a whole session. For this reason, teachers should efficiently use the time."*

These prospective teachers thought that lesson plan could be used not only for one lesson but for the whole year. Through these statements, they referred to planning all of the lessons before the academic year begins. As seen from the explanation of prospective teacher $PT_3$, a lesson plan itself is a kind of a curriculum.

**Knowledge of components in lesson plans**

The prospective teachers specified the elements a lesson plan should contain. They mentioned sections, teaching process etc. while preparing a lesson plan. We coded this category as the knowledge of components in lesson plans.

The prospective teachers explained what sorts of sections a lesson plan should include. We coded this as *structure of the lesson plan sections.* The explanations of prospective teachers are as follows:

> *$PT_1$: "It is a written outline that comprises of what I will do in the classroom, the acquisition I will consider, what I will expect from students, what I will do if an extraordinary thing happens, and the materials I will bring to the classroom. In this way, students do not get confused."*

> *$PT_2$: "A plan should be prepared in a detailed manner for each lesson. It should include the acquisition and the subject, which I will provide the students with. Also, it should contain what I will ask and pay attention as well as the sources I will bring to the classroom."*

> *$PT_3$: "A lesson plan does not need to be in a written form. The teacher must already have something in mind about how he/she is going to do the things in the classroom."*

The prospective teachers stated that a lesson plan should not only include the subject matter knowledge but also the things to do in the classroom. They also mentioned that a lesson plan should contain what a teacher expects from the students. A lesson plan could be called as a "to do list" by the prospective teachers.

One of the other sub-categories, which we explored, is *the structure of teaching process*. The prospective teachers mentioned that timing as well as using materials, activities, and various techniques should be included within the instruction in a classroom. Some of the prospective teachers' explanations of their ideas are as follows:

> *$PT_5$: "We should determine the time usage according to the subjects and the acquisitions."*

> *$PT_7$: "We have to determine the techniques and methods related to the subject. If we are going to use videos, computer software or activities in the classroom, we should adjust the time usage accordingly."*

> *$PT_8$: "We have to plan what we will do in 45 minutes. We will decide whether we will use materials, videos or not."*

The prospective teachers mainly considered the time usage as a factor for structuring the teaching process. It is possible to assert that they perceived time limitation as one of the most important components of preparing a lesson plan. They mentioned other components after time usage component.

The prospective teachers stated that the status of students and teacher, and the environment of the classroom should be taken into consideration while preparing a lesson plan. We coded this sub-category as *the structure of classroom context.* Some of the quotations are stated below:

> *$PT_1$: "I have to consider the status of students, physical environment, and myself. Then I should prepare the lesson plan according to these statuses."*
>
> *$PT_4$: "Physical and school environment should be considered while preparing a lesson plan."*
>
> *$PT_6$: "The features of the classroom context should also be taken into account. If there are roundtables in the classroom, then you could use group work. But if there is a traditional seating in the classroom, then you implement other ways."*

The prospective teachers recommended considering where the school is located while preparing a lesson plan. One of the points that they remarked is desks in a classroom. They suggested implementing a method according to the physical environment of the classroom.

**The knowledge of students' motivation and understandings**

The prospective teachers discussed how they motivate the students in the classroom. They stated that they would pay attention to students' prior knowledge while preparing lesson plans. We named this coded category as the knowledge of students' motivation and understandings.

One of the sub-categories that we explored is *motivating students.* The prospective teachers mentioned the significance of motivating students in the classroom. Some of the quotations of the prospective teachers are as follows:

> *$PT_2$: "Teacher must begin with an introduction that is attention-grabbing to the lesson. Considering how the concept is used in our everyday lives, demonstrating books or displaying interesting videos related to the subject could be part of drawing attention to the lesson at the beginning."*
>
> *$PT_3$: "I have to motivate the students and grab their attention as mentioned in the 5E model of instruction. This must be a part of all lessons. Making the lesson amusing is very important for me; a teacher should not be boring during the lesson."*

The prospective teachers believe a teacher could use interesting activities at the beginning of a lesson. They also added that displaying videos or real life examples could motivate students at the beginning of the lesson. They mentioned that motivating activities should be included in all of the sections of a lesson plan.

*Being aware of students' previous knowledge* is another sub-category that we coded. The prospective teachers took students' prior content knowledge into

consideration while preparing lesson plans. Here are some of the prospective teachers' explanations for this sub-category:

> *$PT_2$: "You have to write to which level of the students you are going to implement the lesson plan to. Also we have to write down reminder notes such as "Pay attention to this point in that classroom" based on our thoughts on students' previous cognitive levels."*
>
> *$PT_3$: "I have to enable students to remember their previous knowledge. We have to detect and know their competence in the previous subjects."*
>
> *$PT_7$: "I organize the lesson plan according to the level of the students in the classroom. After that, I try to choose the best techniques and methods for these students."*

As indicated in the abovementioned statements, prospective teachers stated that teachers must pay attention to the previous cognitive level of their students. They also had plans to determine the techniques and methods according to their students' previous content knowledge. It can be inferred that they would try to map their students' previous knowledge before preparing a lesson plan.

## Prospective Mathematics Teachers' Knowledge of Lesson Plans at the End of the Course

At the end of the course, none of the prospective teachers confused a lesson plan with a curriculum. Of course, it is an expected result after having such a course, in which the prospective teachers were introduced how to prepare a lesson plan. But now, we have the knowledge of how the prospective teachers improve their pedagogical content knowledge on preparing a lesson plan.

### Knowledge of the components in lesson plans

The prospective teachers discussed *the structure of the lesson plan sections* according to the acquisition. They argued the central role the acquisition plays in a lesson plan. Some of the prospective teachers explained their ideas by saying

> *$PT_3$: "It seems to me that a lesson plan should involve everything related to the subject before taking the Teaching methods course. I also thought that it must contain all skills of Bloom's Taxonomy, but it is not like that. We have to organize the lesson in accordance with the acquisition."*
>
> *$PT_8$: "Firstly what we have to consider is the acquisition itself. We determine the aim of the lesson according to the acquisition. Then, we decide the rest of the sections, in the plan in line with this aim."*

The prospective teachers stated that a lesson plan should be prepared in accordance with the acquisition. Before the Teaching methods course, they thought that a lesson plan was similar to a "to do list". As they have obtained an experience

with preparing a lesson plan, they have started viewing acquisition as the key component.

The prospective teachers explained *the structure of teaching process* in the same way, in which they described it at the beginning of the Teaching method course. However, after taking the Teaching methods course, they considered the acquisition firstly while organizing the teaching process. Some of the explanations of the prospective teachers are as follows:

> *$PT_1$: "You have to specify which techniques you will implement and which of them are suitable for the acquisition."*
>
> *$PT_3$: "Modeling examples or just only one photograph could be used while introducing a new concept."*
>
> *$PT_6$: "While designing the lesson plan, we used computer software. But you know, there will not be computers in the classroom context. So we arrange an alternative plan for the activities."*

Before the Teaching methods course, the prospective teachers had given attention to time usage for structuring the teaching process. As seen from their abovementioned statements, they mentioned the structure of the teaching process along with the acquisition. They also added some other elements such as using real life and modeling examples, photographs; as well as applying alternative activities.

The prospective teachers explained *the structure of the classroom context* in a similar way before and after taking the Teaching methods course. They evaluated the teaching practices in the classroom environment. Their statements are as follows:

> *$PT_2$: "Classroom structure is important. For example you decide to use technology but if the classroom environment is not suitable for using technology, it is just nonsense. You have to figure out another way."*
>
> *$PT_4$: "I have to keep in mind the social environment of the classroom while preparing a lesson plan."*
>
> *$PT_8$: "I have to look at the physical conditions of the classroom. According to them, we decide whether to use computers, or. If there is no computer, maybe we could do activities that only require paper and pencil."*

The prospective teachers highlighted the classroom structure while choosing the Teaching methods. They also stated that social situations must be considered while organizing the lesson plan. They specifically stressed on taking technological opportunities in the classroom into consideration.

After taking the Teaching methods course, the prospective teachers stated that the mathematics curriculum must be considered while organizing the lesson plan. We coded this as *considering the curriculum,* which refers to the new sub-category of

structuring the lesson plan. Some of the prospective teachers' explanations are as follows:

> *$PT_3$: "We have to look at the mathematics curriculum; the content of the subject is a very important matter."*
>
> *$PT_5$: "Also we have to examine the time allocated for the acquisition. We have to consider this while preparing the lesson plan."*
>
> *$PT_6$: "What is the acquisition and what the acquisition involves are significant. So, we have to carefully examine the curriculum."*

The prospective teachers stated that what curriculum allowed for the acquisition, such as time usage, is important. They also took into account of subject matter, which is mentioned in the curriculum, while organizing the lesson plans. It can be concluded that after taking the Teaching methods course, the prospective teachers' knowledge of lesson plan also includes the curriculum.

**The knowledge of students' motivation and understandings**

The second category, which is the knowledge of students' motivation and understandings was elaborated and expanded further than the first category, which is the knowledge of components in lesson plans at the end of the course. The prospective teachers stated that being aware of students' understandings and the individual differences could have an influence on the process of preparing a lesson plan. They also mentioned evaluating students' understandings in the process of teaching in this category.

The sub-category of motivating students did not display any major changes after completing the Teaching methods course. The prospective teachers added that maintaining students' motivation plays a crucial role in preparing a lesson plan. Some of the prospective teachers' explanations are indicated below:

> *$PT_3$: "We have to motivate the students so that they can pay more attention and be interested in the lesson."*
>
> *$PT_8$: "We could give some reminders for the subject in order to draw students' attentions. If we want students to learn then we have to make them wonder. Wondering could be triggered through a material, a video or an event from the history."*

The prospective teachers extensively focused on drawing students' attentions at the beginning of the lesson. They thought that the more attention students pay to the lesson, the more motivated they are for the lesson. They also stated that making students wonder is significant to keep students motivated.

One of the other sub-categories, which has displayed minor changes, is *being aware of students' previous knowledge* at the end of the Teaching methods course.

The prospective teachers mentioned cognitive levels of students. Some of their explanations are as follows:

> *$PT_8$: "We should determine learning methods and techniques according to the level of students."*
>
> *Researcher: "How could you determine them?"*
>
> *$PT_7$: "We could choose the methods and techniques based on the readiness level of students. We should consider how students comprehend that subject."*

This sub-category remained the same in terms of its content after the Teaching methods course, as seen from the quotations of the prospective teachers. They emphasized to choose techniques and methods according to the readiness level of their students. They also stated that they would pay attention to the students' cognitive levels.

After completing the Teaching methods course, the prospective teachers stated that there could be differences in students' learning and understanding. We coded this as *being aware of individual differences*, which is the new sub-category. Some of the prospective teachers' explanations are indicated below:

> *$PT_1$: "If students like to solve puzzles, they may be interested in puzzle activities that we have prepared. However, you have to think alternative activities for the others, who do not like solving puzzles."*
>
> *$PT_6$: "You have to take students with high abilities and students with low abilities into account at the same time while designing activities in the lesson plan."*
>
> *$PT_8$: "For the related acquisition, we could investigate where students make mistakes or have difficulties. We could consider the Theory of Multiple Intelligences. For the students with visual-spatial abilities, we could use materials or videos. Also, whenever we use group work in a classroom, we can ask students, who have verbal-linguistic abilities, to prepare an activity."*

The prospective teachers stated that there could be different activities for different students. They offered to elaborate the activities according to individual differences of students. They also suggested investigating the difficulties the students experience regarding the concepts through the literature and thus raising awareness for these difficulties.

After taking the Teaching methods course, the prospective teachers stressed on monitoring students' learning during the act of teaching. This new sub-category that we coded is *evaluating students' understandings in the process of teaching*. One of the prospective teachers explained his/her ideas through the following statement:

*$PT_8$: "We should plan to ask high level questions to the students between the activities that we implement in the classroom. These questions should assess if the students understood the first activity, or not, before proceeding with the second activity. In fact, we receive feedbacks about the learning process."*

As seen from the quotation, $PT_8$ believe that asking questions about the activities implemented by the teacher serves as an evaluation. This evaluation could be for both assessing students' learning and feedback of the implementation. It can be said that the prospective teachers enhanced their knowledge of preparing a lesson plan at the end of the course.

**Knowledge of teacher's self-assessment**

The prospective teachers explained what a teacher must know for preparing a lesson plan. Also they mentioned how a lesson plan must be used by a teacher. We coded this category as the knowledge of teachers' self-assessment, which evolved from the data at the end of the Teaching method course.

*Examining different resources* is one of the sub-categories that we explored from the data. The prospective teachers denoted that using libraries, looking for advanced level books etc. are essential for preparing a lesson plan. Some of the prospective teachers' quotations are noted below:

*$PT_2$: "One of our instructors told us: "Wherever you are appointed, go to the library of the university in the city." I agree with him, as teachers, we should follow the academic studies."*

*$PT_5$: "How and what we will teach students in the lessons have roots in the field of academics. We could forget some of them, this could happen. But we could use books or internet based resources to remember and revise our knowledge."*

The prospective teachers stated that they would go to the library in order to follow the new studies in mathematics education literature. They also recommended using books and internet for maintaining their knowledge active. It can be inferred that the prospective teachers intend to enhance their background for both subject matter knowledge and pedagogical knowledge.

The prospective teachers declared the importance of mathematical content knowledge while preparing a lesson plan. We coded this sub-category as *reviewing teachers' own mathematical content knowledge*. Some excerpts from the prospective teachers' statements are as follows:

*$PT_4$: "Before this course, I thought that every definition in the books was right. I have never criticized them. I always believed that they all were correct, but this is not the case. While preparing the lesson plan, we made this mistake more than once. From now on, I think we will criticize the mathematical knowledge in every sense."*

> *$PT_5$: "We prepare an activity in our lesson plan. However, we have seen that we couldn't make the definition of limit from the right. The instructor of the course showed us how to re-organize our activity. I believe that teachers have to be certain of their mathematical content knowledge before preparing a lesson plan."*

The prospective teachers realized the importance subject matter knowledge possesses for preparing the lesson plan. They also pointed out the mistakes they made about the concepts while preparing a lesson plan. It is possible to say that for the prospective teachers, having the right mathematical concepts is the main component of preparing a comprehensive lesson plan.

One of the sub-categories for the knowledge of teachers' self-assessment is *using the lesson plan as a guidance*. The prospective teachers asserted that the lesson plan serves as a guidance in the process of instruction. Here are some of the prospective teachers' explanations:

> *$PT_1$: "I think that we prepare the lesson plan for ourselves. It facilitates the teachers' work. It determines your path and is a kind of a guidance for the lessons. It also helps with students' comprehensions. You make yourself confident. Everyone wins. For example if there is something to be said that is very important and you forgot it, you can remember by looking at the plan. They could monitor the time schedule. In fact, it could serve as a development schema of the teachers."*

> *$PT_2$: "The lesson plan is helpful for the teachers. If you make the plan for each lesson, it will be fruitful for you and your students."*

The prospective teachers thought that a lesson plan is not only for students' understanding of the subject but also for teachers. They declared that the lesson plans could make the lessons easier to organize for teachers. They believe that preparing lesson plans could help teachers to monitor themselves during the lessons.

## Discussion, Results and Suggestions

Lesson planning has the potential to reveal prospective teachers' knowledge of content, teaching and students' understandings (Chick & Pierce, 2008). From this point of view, we tried to explore the developmental process of prospective secondary mathematics teachers' knowledge of lesson planning during the "Teaching methods in mathematics education" course. For this purpose, we interviewed eight prospective teachers. As stated in the literature, we have seen that the participants improved their pedagogical content knowledge about lesson plan (Prescott et al., 2013). This could be interpreted as a natural result of having such a Teaching methods course as we mentioned before. The findings indicate that prospective secondary mathematics teachers' knowledge of mathematics lesson plans change from structural level to instructional level via teaching methods course. At the beginning of the course, the prospective teachers mostly discussed structural issues such as sections of a lesson plan, elements of teaching process, and classroom

context. After the course, they were able to provide elaborative information about how to organize an instructional process. They also put the acquisitions in center of the lesson plan. It is possible to say that the prospective teachers improved not only their knowledge of content and teaching, but also their knowledge of curriculum (Hill et al., 2008; Tatto et al., 2008). The prospective teachers obtained further knowledge of content and students (Hill et al., 2008) after the course emphasized the significance of considering students' motivation and understandings while preparing a lesson plan. For example they highlighted the importance of being aware of individual differences and evaluating students' understandings in the classroom. Having this knowledge could prepare the prospective teachers for unexpected situations (Shalaway, 1997) in their early career.

Prospective secondary mathematics teachers had never mentioned mathematical content before they took the course; however, they had recognized the role of their own mathematical content knowledge, and the effect it has on designing a plan, which may result from the instructor's point of view in the course. The instructor emphasized the importance of mathematical content in both being a rigorous mathematics teacher and preparing a lesson plan according to the acquisition in curriculum during the course. Accurate mathematical knowledge itself is not enough for an efficient lesson plan; however, it still plays a key role in structuring a lesson plan (Ball et al., 2005; Ozogul & Sullivan, 2009).

The prospective teachers also started to review a lesson plan as a guidance for their teaching experiences, which may be due to the fact that they considered themselves as more of a teacher at the end of the course. We believe that it could be useful to provide prospective teachers with feedback so as to support the development of their knowledge of lesson plans as we did at the end of the course. As the prospective teachers presented their lesson plan, they received constructive feedbacks not only from their instructor but also the other prospective teachers. The Teaching methods course enabled the prospective teachers to effectively discuss and reflect on all lesson plans they presented. They gained insight into preparing a lesson plan both through their own experiences and also the experiences of others. The context itself served as a teaching tool and a way to develop their pedagogical content knowledge, as stated in the literature (Chick & Pierce, 2008; Prescott et al., 2013). The role of such a context in constructing pedagogical content knowledge of prospective teachers could be studied in future researches. Further researches that are designed to investigate how prospective mathematics teachers use lesson plans in their teaching experience, could also provide significant implications for both prospective teachers and teacher educators.

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# Configuration of Modulations in Theme and Transition Sections in Beethoven Op 110 Piano Sonata Part One

**Halil Levent Kuterdem***

## Abstract

Started his musical training at an early age, Ludwig van Beethoven has become one of the composers who made his mark in the classical period with his extraordinary skills and training. The composer has approached the musical theories of his time in a more innovative manner and he has made innovations in harmony, form and modulation concepts with his music. One of the most fundamental reasons of these innovations and diversification is the impacts of the French Revolution which are also evident in his works, because Beethoven has found himself right in the middle of this revolution and this dragged him to ideological innovations quite different than other composers of the time. Musical historians emphasize that these innovations have occurred in the medieval and maturity period of the composer. Although the impacts of W. A. Mozart was felt before his maturity period, Beethoven's innovative impacts have started to be more evident and stand out in his every other work. It is said that op. 24 Spring Sonata and op.28 Piano Sonata that he composed in 1801 are significant representatives of these impacts. Op 110 Piano Sonata is also one of the maturity period works of Beethoven and it is one of the three piano sonatas that he has composed between 1821 and 1822. It displays the basic elements of sonata form in itself and it consists of 3 main parts. The titles of these parts are Moderato cantabile moltoespressivo, Allegro molto and Allegro ma non troppo.In this study, the modulation structures in theme sections and transition bridges of the first section in Moderato cantabile moltoespressivo character structure will be discussed. Modulation structures are one of the most fundamental composition elements which preserves the dynamism and freshness and ensures continuity of a work. It is observed that these structures have acquired a different aspect in Beethoven's character compared to the perception of the time. This study will shed light to how the contrast concept which is considered as one of the important elements in composition material is used in modulation sections of Op 110 Piano Sonata and its necessity in piano training.

***Keywords:*** Beethoven, form and modulation, sonata, form in music

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# Beethoven Op 110 Piyano Sonatı Birinci Bölüm Tema ve Geçiş Bölgelerindeki Modülasyonların Kurulumu

## Öz

Küçük yaşta müzik eğitimine başlayan Ludwig von Beethoven, olağanüstü yeteneğiyle ve aldığı eğitimle klasik döneme adını yazdıran besteciler arasında yer almıştır. Beethoven, klasik dönemin ve klasik dönemden romantik döneme geçişin en önemli ve en verimli bestecilerindendir. Besteci, zamanının müzik kuramlarına daha yenilikçi yaklaşmıştır ve müziğiyle gerek armoni, gerekse de form ve modülasyon kavramlarına yenilikler getirmiştir. Bu yeniliklerin ve farklılaşmanın en temel nedenlerinden biri eserlerine yansıdığı da hissedilen Fransız Devrimi'nin etkileridir. Çünkü Beethoven kendisini bu devrimin ortasında bulmuştur ve bu durum onu döneminin diğer bestecilerinden oldukça farklı fikirsel yeniliklere sürüklemiştir. Bu yenilikler için müzik tarihçileri tarafından bestecinin orta çağı ve olgunluk döneminde ortaya çıktığı vurgulanmaktadır. Bestecinin olgunluk döneminden önce, W.A. Mozart'ın etkisi seziliyor olsa bile Beethoven'in yenilikçi etkileri her eserinde gittikçe belirginleşmeye ve ortaya çıkmaya başlıyordu. 1801 yılında bestelediği op. 24 İlkbahar Sonatı ve op.28 Piyano sonatı bu izlerin belirgin temsilcilerinden olduğu söylenmektedir. Op 110 piyano sonatı da Beethoven'in olgunluk dönemi yapıtlarındandır ve 1821 yılında bestelediği, 1822 yılları arasında yazdığı üç piyano sonatından birisidir. Eser kendi içinde sonat formunun temel ögelerini göstermekle birlikte 3 ana bölümden oluşmaktadır. Eserin bölüm başlıkları "Moderato cantabile molto espressivo", "Allegro molto", "Allegro ma non troppo"dur. Bu çalışmada, "Moderato cantabile molto espressivo" karakteri yapısındaki birinci bölümün tema bölgelerindeki ve geçiş köprülerindeki modülasyon yapıları ele alınmıştır. Modülasyon yapıları bir eserin dinamikliğini ve tazeliğini koruyan, eserin sürekliliğini sağlayan en temel kompozisyon ögelerindendir. Beethoven'ın kendi karakterinde dönemin anlayışına göre bu yapıların daha farklı bir boyut kazandığı da gözlemlenmektedir. Kompozisyon materyalinde önemli ögelerden olan kontrast kavramı, op 110 piyano sonatının modülasyon bölgelerinde nasıl sağlandığı ve piyano eğitiminde gerekliliğine ışık tutacağı düşünülmektedir.

***Anahtar Sözcükler:*** Beethoven, form ve modülasyon, sonat, müzikte form

## Introduction

Beethoven is a composed who is considered as quite productive and innovative in the history of music. During the French Revolution, the revolution's impacts have reflected on his music. For that reason, the composer's music is divided into three main periods. In the second period in which he started to find his own identity, most of his works were heavily influenced by the French Revolution. His maturity period, which is considered as the third period, is the period in which all innovative ideas sprouted. The innovations and improvements he has made in the sonata form in this period have shed light to many composers after him. Sonata types have changed in time and made their mark in the classical period ahead of other forms in mid-18th century.

The main topic of this study, Configuration of Modulations in Theme and Transition Sections in Beethoven Op. 110 Piano Sonata Part One, is a theme which shows that Beethoven was a composer who thought differently and focused on improvement. Beethoven may use all kinds of materials as modulation elements. With this aspect, he differs from other composers, because Beethoven has used even silence as a modulation tool. Sudden rests during the thematic traffic in his music makes transition to different tones natural. What is presented here is a modulation attitude which is outside the general and known modulation operation and which is innovative. In Op. 110 Piano Sonata, modulation operation and theme bridges are configured with traditional structures. Tone centres which are presented as structural and harmonic in traditional sonata perception are as follows: They consist of three main parts structurally.These are Exposition ($1^{st}$ and $2^{nd}$ theme), Development – Reexposition.

In Exposition part, the fundamental themes are introduced. Tone centres of themes may be different and there may be transition bridges or modulation bridges which interconnect these themes. The scale which ends with the whole or dominant root of the main theme is the place where destinationbridge starts. In this bridge which develops towards second theme, sometimes smooth decorations are made mostly from main theme motives. Sometimes composer may use new ideas in this bridge. The second theme which is in contrast with the main theme character is heard in dominant tome in major works and in related major in minor works. In the development section, the themes and motives in exposition are addressed and processed in various ways.

Development section is like the laboratory of a composer. He makes all kinds of thematic or motive development in this area. It is an area which is creased by diversification of themes and in which the composer displays his creativity. Reexposition reaches the main tone with the dissolution of the dominant and enters into repetition of the exposition. In the compositions of classical period, this second section is prepared with dominant which takes long in general. The length of development section is mostly equals to the length of exposition. Reexposition section starts with hearing the main theme in main tone and themes in the first section are repeated under dominance of the main tone. Only towards the second

theme, the destination bridge which forms the connection settles the end on dominant. While works in minor tone makes the second theme heard in related major in exposition, it is mostly heard in the same tone.

Advanced technique and most of the trends in communication of music in Beethoven's music reveal the thematic elements he had written in a complex way in some sonatas. For that reason, his last five piano sonatas are very important and considered as masterpieces. The perception of existence of the themes outside the known classical perception of sonata form is impossible. Changes are experienced continuously about the harmonic progresses in Beethoven. Dome improvements such as extending, changing or shortening themes are seen in these sonatas in Beethoven's music.

Especially the Piano Sonata Op. 110 can provide more convenient reference on these matters. By combining different factors in various appearances, Beethoven has created a piece which is bedazzling with its various and emotional peaks. Syncopated partitions and arpeggio structures in the first theme are felt as floating above rhythmic time. Then, it combines an emotionally exhausted pain with a second movement which is classified as a musical joke. When each one of these movements are analysed, they reflect the details in the music and harmonies and melodic ideas which are important in terms of form elements.

Contributions of Ludwig van Beethoven in classical period sonata form: the basic principle which process the sonata form in Beethoven's music is that the lifestyle that the artist has lived and reflected in his music are seen in every step. Beethoven's music wanders around a series of dramatic contradictions. A theme or a musical phrase responds to a contradicting theme or musical phrase. A passage in a rhythm is responded by a passage in another rhythm. High pitched pieces are responded by low pitched pieces, solo instrument sounds are responded by mass sounds and a tonality is responded by another tonality. The end of the work consists of the summary and resolution of contradictions. According to Vincent d'Indy (Hodeir, 2003, p. 91), there are six types of development ways in Beethoven'ssonatas:

- Rhythmic development: Continuity of single rhythm over various melodies and harmonies
- Melodic development: Change in harmony and rhythm while melody remains the same
- Harmonic development: Change in rhythm and melody while harmony remains the same
- Increase or extension: development of any motive of a theme by adding new notes and extending its melodic borders

- Decrease: Removing some notes of the theme
- Stocking: Stocking a few themes or phrases

Abovementioned techniques are in fact the different presentations of the structures which Beethoven uses in composition techniques and exist in the foundations of music. Contrast is quite important in music. Beethoven realizes this concept accurately in his music. Op 111 piano sonata is composed in A flat major tonality. The first theme in the exposition section is also in the same tone. The second theme is in E flat major in dominant tonality. In the piece which modulates to different tones in development section, the reexposition section is in main tone. However, the second theme group in this section is also in the same tone.

**Structural Analysis and Exposition Section of Op 110 Part One**

*1st theme – transition bridge – 2nd theme*

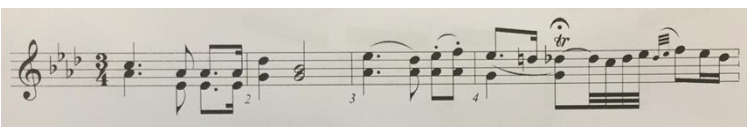
It can be divided into sections as exposition, development, reexposition, secondary development, reexposition and coda. First and second themes in the exposition section are in A flat major tonality. Then the transition bridge carries the piece to the third theme which is heard in E flat major axis. The 3 themes in the exposition section are different than the classical sonata structures. The first step in development section starts with the motives of the first theme. The first theme encountered in the reexposition section is again heard in A flat major tone and then connects to the transition bridge. In the secondary development section, tonality becomes D flat major and this section takes its motives from the second theme. It connects to the exposition again with the modulations of the transition bridge. This section which is heard in A flat major is presented with the motive characters of the third theme.

**1st Theme Section**

Between 1st and 4th measures, it starts in tonic (A flat major) axis and ends in dominant seventh chord. The theme which starts with simple chords leads into syncopated rhythmic figures

Figure 1

*First Theme 1st – 4th Measures*

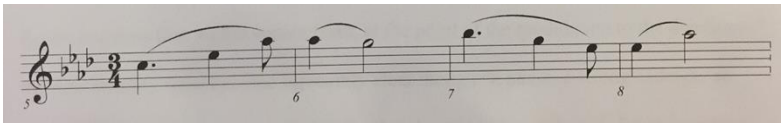


In the example where the section of first four measures is given, it is seen that two-measure tonic dominant relationship is presented in association with ornamented notes. From the 5th measure, motives of the theme section are clearly heard in the

main tonality. The section is in a quite elegant and lyrical character. The arpeggio character shown in Figure – 2 also shows itself in the transition bridge as well.

Figure 2

*Second Theme 5th - 8th Measures*



In the structure where tonic dominant symmetric relation stands out, D flat major tonality dominant chord is heard beginning from the 9th measure.

Figure 3

*Dominant Chord*

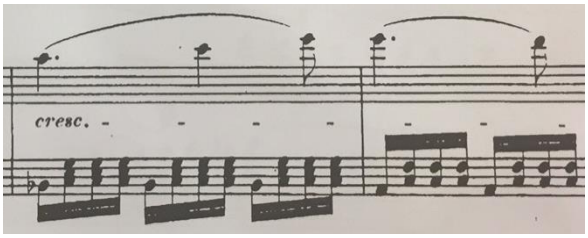
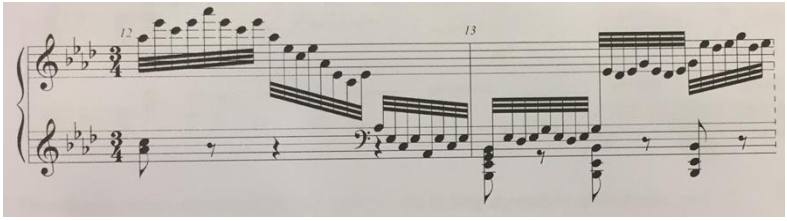



Figure 4

*Transition Bridge Arpeggio Character*



Transition bridge which comes after the first theme contains modulations which prepares for the second theme. These modulations are heard with arpeggios which starts from the main tone. The second theme is arrived with the notes and chromatic movements which are altered on the transition bridge where dominant tonic relation is presented with arpeggios.

In the 18th and 19th measures, a section is realized using faster inactivity and extreme intervals. This gives a contrasting element in the material and suddenly arrives in a section which is marked as both piano and molto legato. E flat major modulation is completed with cadence in its first beat in 28th measure. The second large group of exposition is realized in E flat major tone as expected.

Figure 4

*The Section Where the Second Theme Starts Appears in the Second Measure in the Image*

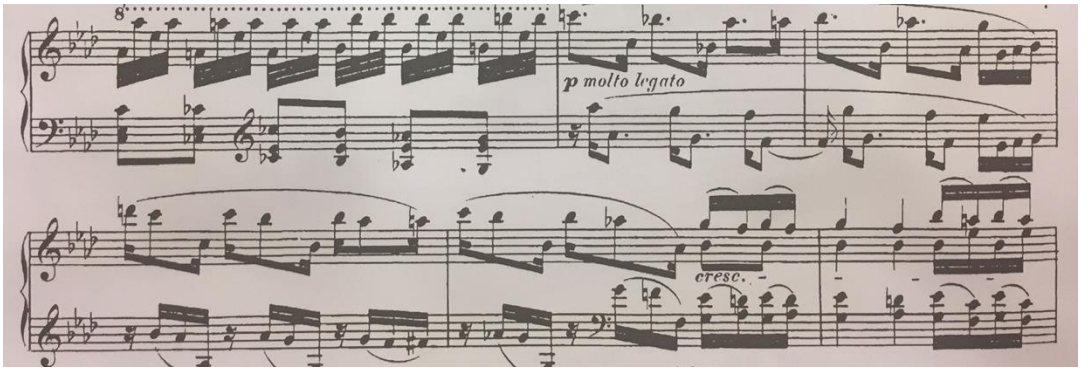
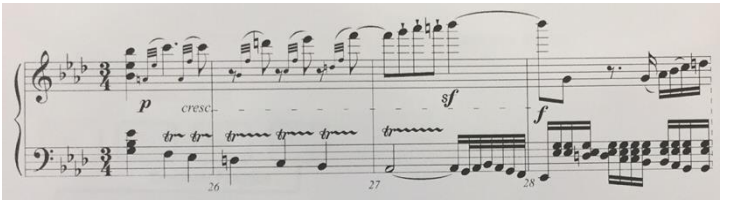



Figure 5




Modulation patterns which appear in the development section between 40th and 55th measures are as follows:

**A flat major**

F minor (Fm)
C dominant seventh (C7 – F minor dominant seventh)
F minor (Fm)
C dominant seventh (C7 – F minor dominant seventh)

Fminor (Fm)
C dominant seventh (C7 – F minor dominant seventh)
F minor (Fm)
**A flat dominant seventh (C7 – F minor dominant seventh)**

D flat major
A flat dominant seventh (Ab7)
D flat major
**F dominant seventh (F7)**

B flat minor

F dominant seventh (F7)

B flat minor

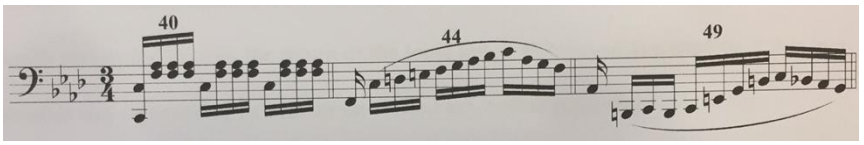
**E flat dominant seventh**

As seen in the above chart, the measures of the development section which starts with the related minor related to the main tone wander around the dominant seventh of the related minor tone. The second modulation pattern has led to a different tone centre with the dominant seventh of the main tone. Appearance of D flat major tone is because it is the forth degree of A flat major which is the core tone of the sonata. It generally consists of principles formed by I-IV-V-I functions. This pattern is broken with F dominant seventh chord which appear in the section related to D flat major. The section transferred to B flat major returns to the main tone of the sonata with E flat dominant seventh chord.

In Figure 6, accompaniment plan played with F minor fourth sixth chord cycle shows itself in the scale playing which consists of C dominant seventh notes.

Figure 6

*F Minor – C Dominant Seventhsection in Development Section*




After this section, Beethoven realizes the tonal changes step by step in a balanced way within the framework of the tonal plan stated above.

**Reexposition**

Reexposition section appears as expected in the concept of classical sonata. It happens with two times returns as in both the main tone and the 56$^{th}$ measure. Interestingly, the whole previous section is allocated to the development of the theme. This certainly indicates its beginning in the repetition of the exposition section. While the right hand plays the theme, the left hand accompanies with note arpeggios. This continues up to the 60$^{th}$ measure. At this point, melody and accompaniment are replaced. The 62$^{nd}$ measure is a transition to the next section of the movement.

**Development Section (2nd Section)**

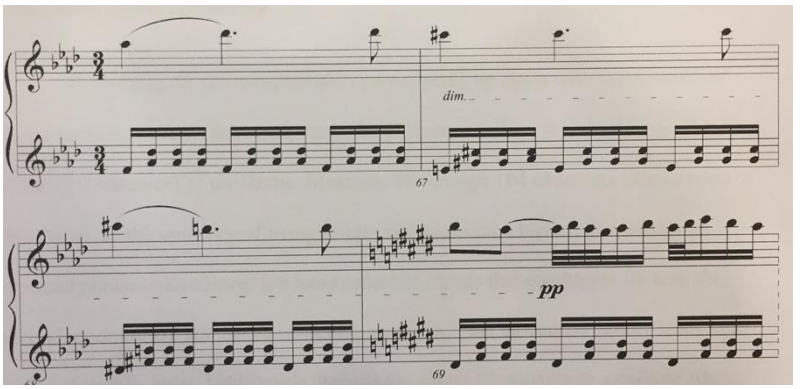
It is not a section which always occurs in traditional sonata forms and a secondary development section is not necessary for completing the sonata form.

However, it is widely used. In fact, another aspect of the secondary development is that materials are used clearly.

Beethoven returns to the tone centre and general line in a strange way by wandering around the tone which is not quite close to the structure before resolving into A flat major tone. In the section where harmonic modulation is presented, a homogenous modulation was realized. Starting from the 63rd measure, the theme occurs in a transposed position. Since this theme is already presented in the main tone, it is not necessary for this.

Figure 7

*Enharmonic Modulation Section – E Major / Fflat Major – 66th and 69th Measures)*




Although Beethoven does not completely sacrifice the material he presents in main tone, he has gained a significant advantage in the composition in terms of contrast by transposing it to another tone. After the melodic expression of the two themes ends, tonality becomes major centred. This modulation is provided with F flat major.

**Conclusion of Reexposition**

In the 87th measure, the repeated section is summed up with the introduction of the theme in main tone for the third time. Other than tone change, it is almost a perfect copy of the first expression of the theme. 96th – 104th measures form an extension of this theme and the phrases are repeated on the chords which emphasize E flat major with second secondary B flat dominant seventh chord. This movement offers a series of simple, silent and retained chords which turns tonality into A flat major tone in a certain way.

## Conclusion and Discussion

Beethoven op. 110 piano sonata is an important masterpiece which can be used in piano training. It is one of the advanced level works of Beethoven and it is well known in the literature. The structure of the piece contains innovations with the classical sonata structure. While modulation areas wander around the main tone,

transition to further tonal centres within the framework of contrast perception reveals the expertise of the composed in this area. Its harmonic structure does not show the opposite of what is known in these aspects. However, unexpected tonal transitions in small sections bears the signature of Beethoven in the piece. Structurally, although the piece is within the framework of classical sonata perception, it also shows innovations within itself. This also makes the piece more interesting. Thanks to the developments in the piece which support contrasting structures, it reveals the difference in sonata literature. Piano instructors and students may deliver more efficient performances in the matters specified herein to better understand and convey the sonata. In those aspects, Beethoven, the essential composer of the training music repertories in music schools and his pieces will be useful to not only the listeners but also the students who receive piano training and everybody who wants to learn how to listen to music well.

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İki yazarlı çalışmalara atıfta bulunulduğunda her iki yazarın da soyadını yazılmalıdır:

- (Anderson & Bjorn, 2003)
- As Anderson and Bjorn (2003) illustrated in their recent study
- As recently as 2003, a prominent study (Anderson & Bjorn) illustrated

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- (Anderson, Myers, Wilkes, & Matthews, 2003)

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Haag, L. & Stern, E. (2003). In search of the benefits of learning Latin. *Journal of Educational Psychology*, *95*, 174–178.

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