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Turkish Online Journal of Qualitative Inquiry (TOJQI)
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Contents

Research Articles

Examination of Turkish Sign Language Education According to the Opinions of Preservice Teachers who Attend to the Sign Language Course 1-38
Pelin Pıştav Akmeşe Nilay Kayhan

Opinions of School Administrators about Accountability in Educational Organizations 39-68
Beyza Himmetoğlu Damla Ayduğ Coşkun Bayrak

Development of Three Dimensional Virtual Court for Legal Education 69-90
Sakine Öngöz Hasan Karal Mustafa Tüysüz Adil Yılmaz Ahmet Kılıç

Investigating the Current and Pre-service Mathematics Teachers' Opinions about FATİH Project and Technology Use in Mathematics Education 91-121
Mehmet Fatih Öçal Mertkan Şimşek

Examination of Technological and Pedagogical Properties in Short Film Designs 122-140
Nevzat Yiğit Nedim Alev Özlem Yurt Ebru Mazlum

Infusing Global Perspectives in A blended Mentoring Practice for Designing E-Material for English as a Foreign Language Learning 141-160
Alev Ateş Çobanoğlu Zehra Esin Yücel Okşan Uzunboylar Beril Ceylan

Turkish Online Journal of Qualitative Inquiry (TOJQI)
Volume 8, Issue 1, January 2017: 1-38
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Research Article

Examination of Turkish Sign Language Education According to the Opinions of Preservice Teachers who Attend to the Sign Language Course

Pelin Pişkav Akmeşe[1] Nilay Kayhan[2]

Abstract

Sign language is one of the methods the hearing impaired individuals use to communicate. The teachers have a great responsibility in the use of sign language as a communication tool in educational environments. Thus, it is important to train teachers who know sign language and can actively use it in education. This study aims to examine the opinions of the faculty of education students who take elective sign language course related to Turkish Sign Language education. In this study, which has been performed in descriptive design, semi-structured interview technique from among qualitative research methods was used. For this purpose, a semi-structured interview form was prepared and an expert's opinion was received. 62 preservice teachers from four different departments (Guidance and Counseling, Primary Science Teaching, Computer Education and Instructional Technologies, Primary School Teaching) who had completed sign language education were interviewed face-to-face. NVivo program was used for the detailed and holistic analysis of the findings which reflected the opinions of the preservice teachers. The data were divided into four main themes:

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"Effectiveness of Turkish Sign Language in daily communication", "Having hearing impaired family members, relatives or friends", "Necessity (interest) for the Turkish Sign Language", "Academic Efficacy of the Turkish Sign Language". The findings of this study are thought to be able to contribute to the sign language course programs and professional competency of the teachers who will serve in the field of special education.

Keywords: *Turkish Sign Language, Turkish Sign Language course, hearing impaired, communication, awareness*

Introduction

There are two types of natural human languages. The former one is auditory-spoken languages that use sounds and the latter is visual-sign languages that use gestures. Sign language is a whole and inclusive language in which visual symbols created by the hands, fingers, head, face, mimics, and gestures, and all body movements are used instead of vocal symbols (Armstrong & Wilcox, 2003; Kubuş, İlkbaşaran & Gilchrist, 2016). Sign language is one of the methods the hearing impaired individuals use to communicate (Arık 2016). It is necessary to diagnose the hearing impairment early on, implement a hearing aid as soon as possible and start education to enable hearing impaired individuals to gain spoken language and speech skills effectively (Akın, Tezer, Şahin & Akar 2009; Boons et. al, 2013; Geers, Tobey, Moog & Brenner 2008; Pistav-Akmese & Acarlar, 2016). An individual's having a normal hearing is important for benefiting from the education process completely. However, it is not possible for every child who uses hearing aid or cochlear implant and receives auditory verbal education to communicate verbally at the same level with their peers (Belgin & Yücel, 2011). A study conducted by Pistav-Akmese and Acarlar (2016) has been stated that age-appropriate score observed in 63% of the children on measures of receptive language 50 % on expressive language is and Geers et. al. (2009) 47% on receptive language and 39% on expressive language. Another study in which the vocabulary was examined has been stated that age-appropriate score observed in 47% of the children on measures of both receptive and expressive vocabulary (Pıştav-Akmeşe & Kirazlı, 2016a) and 50% on receptive vocabulary, 58% on expressive vocabulary (Geers et. al. 2009). It is necessary to determine the communication method and education system that the child will benefit the most and especially to teach formal sign language to the children who have a low chance of acquiring speech skills in order to express themselves by taking into consideration the age of the diagnosis of hearing impairment, age of implantation and language development level related to language development of hearing impaired children (Belgin & Yücel, 2011; Pıştav-Akmeşe & Kirazlı, 2016b).

Hearing Impairment and Communication

Our country is one of the countries in which hearing impairments are most frequently seen. Approximately 2500 babies are born with hearing impairments every year in Turkey (Şahlı &

Belgin, 2011). In accordance with the level of impairment, delays are seen in the social, emotional, communicative and educational areas of hearing impaired children in addition to language (Piştav-Akmeşe & Kirazlı, 2016b; Seeber, Baumann & Fastl, 2004; Şahlı & Belgin, 2011). As the level of hearing impairment increases, speech production and vocabulary decrease; literacy skills and academic success diminish (Diefendorf, 1996; Piştav-Akmeşe & Kirazlı, 2016a). The results of the researches in the literature shows that the use of sign language positively affects the cognitive, social, emotional and language development and decrease the difficulties that can be encountered (Behne, Carpenter & Tomasello, 2005; Felzer, 1998; Goodwyn, Acredolo & Brown, 2000; Göl-Güven 2016; Moore, Acledolo & Goodwyn, 2001; Vallotton, 2011).

The studies conducted with the hearing impaired individuals at different ages and in different environments has been shown that they prefer sign language for communication. For example, high school students have been reported to frequently use sign language in their intraschool communication, have difficulty communicating outside of school, try to use speech, lip reading and writing. The same study has been stated that 32 teachers who work in high school for deaf use sign language in their nearly 100% of communication with their students (Parlak, 2011). In another study in which the communication preferences of the hearing impaired individuals were examined in different environments and with different people in their daily lives, it has been stated that 70-75% of the hearing impaired individuals who were born with severe or profound hearing loss prefer sign language in their daily lives (Gürboğa & Kargın, 2003). These results show that the hearing impaired prefer sign language both in school and their daily lives.

Turkish Sign Language (TSL) Education in Turkey

The interest in sign language has been gradually increased both in the world and Turkey (Arık 2016; Kubuş, İlkbaşaran & Gilchrist, 2016). This interest especially affected the educational regulations in higher education institutions and enabled the opening of sign language programs. Gallaudet University in the USA, Amsterdam University in the Netherlands, Hamburg University in Germany, Jyväskylä University in Finland and London (Collage) University in England have been opened post graduate and doctoral programs

focusing only on sign language linguistics researches as well as the undergraduate programs (Arık, 2016).

The first formal study regarding education was Sign Language Guide for Adults which was published in 1995 in the field of Turkish Sign Language (or *Turkish Sign Language* [TSL] in Turkish) lexicology by the Ministry of National Education General Directorate of Special Education Guidance and Counseling Services. The guide has been arranged as a word list in which Turkish is used by the use of signs. The guide published in 1995 was renewed and Turkish Sign Language Dictionary (1986 words and idioms) was published in 2012 by the same institution (Kubuş, İlkbaşaran & Gilchrist, 2016). The legal regulations have a determining role in the increase of the scientific studies regarding sign language as with the other fields. It has been stated in the Law on Disabled People and Making Amendments in Some Laws and Decree Laws, which was adopted by Grand National Assembly of Turkey on July 1, 2005 and published in the Official Gazzette on 07.07.2005, that the impaired people should be protected against discrimination. The first Article regarding TSL and in which "Turkish Sign Language" phrase is stated in the Republic of Turkey is *"Article 15: Turkish Sign Language is created by Turkish Language Institution in order to provide the education and communication of the hearing impaired people."* (Kubuş, İlkbaşaran & Gilchrist, 2016). It can be said that the studies about the sign language have been accelerated in the last decade in Turkey.

The conventions accepted by international parties and the results of the researches have been effective in this process. Our country has been a part of the United Nations Convention on the Rights of Persons with Disabilities (UNCRPD, 2006) since 2009. This convention is an important step in the language rights of the hearing impaired individuals. It has been stated in the Article 24. Part 3 that regards the education of the hearing impaired (b) "*Facilitating the learning of sign language and the promotion of the linguistic identity of the deaf community"* and (c) *"Ensuring that the education of persons, and in particular children, who are blind, deaf or deafblind, is delivered in the most appropriate languages and modes and means of communication for the individual, and in environments which maximize academic and social development."* (Kemaloğlu, 2014a; Kubuş, İlkbaşaran & Gilchrist, 2016). According to the report of Balkan Questionnaire Study which was published in 2007, the hearing impaired individuals face serious problems. The statements of the hearing impaired individuals who

had participated in the questionnaire such as *"The teacher was just talking in front of us and we were just sitting in the class"* or "*We have been graduated from the school and received a diploma that shows we completed the education. But we still haven't known how to write and read."* reveals the situation of the hearing impaired individuals in our country. Besides, the communication is affected negatively as a result of that the teachers who serve in schools for the deaf don't know sign language in many countries around the world and this situation resulted in a decrease in the quality of the education. A good education in multilanguage is only possible with the teachers who know at least two languages at an advanced level. (Skutnak-Kagnas, 2000; *as cited in* Kubuş, İlkbaşaran & Gilchrist, 2016). It is a well-known fact that among the schools for the deaf in our country, there has not been an institution where the Turkish Sign Language (TSL) is taught deliberatively. Similarly, there has not been any education institution that gives a bilingual education with both Turkish Sign Language (TSL) and auditory verbal education (İlkbaşaran 2013; Kemaloğlu 2014b; Kubuş, İlkbaşaran & Gilchrist, 2016).

With regard to the sign language education in higher education institutions, "Sign Language" has been added to higher education programs as an elective course as of 2013-2014 academic year in accordance with the decision of September 2013. It has been added as a compulsory course in the hearing impaired teaching programs as of 2014-2015 academic year. "Turkish Sign Language" is included in the special education teaching undergraduate programs as a 2 credit compulsory course in the 3rd term in the 2016-2017 academic year according to the current new regulation. *"Turkish Sign Language"* course book prepared by Akalın and Cavkaytar (2014) has been used as a comprehensive course book in the teaching of Turkish Sign Language (TSL) in the current situation. The course hours of the sign language are low in higher education, besides, the number of the academicians who will be able to give "sign language" course in accordance with the language competency standards is not sufficient. Pıştav-Akmeşe (2016) stated that the sign language education should be given to groups of maximum 20-25 people, it should include theoretical and practical aspects intensively and the sign language instructors must have pedagogical formation education as the result of her research in which the opinions of 190 individuals from a basic sign language certification program about the sign language education and competency of the sign language instructors.

There have not been any undergraduate programs regarding the Turkish Sign Language field in Turkey yet. Establishing four-year undergraduate programs that will train experts in sign language field, training Turkish Sign Language interpreters, developing curriculum and training materials to be used in these programs can be stated as the urgent needs.

Sign language's being known and used by the personnel who will participate in the education of the hearing impaired individuals is important for the early intervention. Nearly 100% of the hearing impaired individuals who are not able to benefit from early, intervention and auditory verbal education opportunities and educated in the schools for the deaf prefer sign language for communication (Parlak, 2011). In this regard, sign language is highly important for a healthy communication with the hearing impaired individuals and for including them to the society. Early and natural acquisition of sign language is a privileged subject. The biggest problem in this field is the lack of the teachers who know Turkish Sign Language and the bilingual education programs in which the Turkish Sign Language is used in the preschool education and primary education institutions (Kubuş, İlkbaşaran & Gilchrist, 2016). This study aims to examine the opinions of the faculty of education students who take elective sign language course related to Turkish Sign Language education. The findings are thought to be able to contribute to the sign language course programs and application process.

Purpose

The purpose of the research is to examine the opinions of 62 preservice teachers who had attended to elective sign language course about the Turkish Sign Language education. For this purpose, the answers for the sub-purposes below have been sought:

1. What are the opinions of the preservice teachers who attended to elective sign language course related to the effect of sign language on the communication process?
2. What are the opinions of the preservice teachers related to the reasons for preferring sign language?
3. What are the opinions of the preservice teachers related to the use of Turkish Sign Language in educational environments?
4. What are the opinions of the preservice teachers related to the effect of sign language on their vocational career?
5. What are the opinions of the preservice teachers related to their competency for using the Turkish Sign Language in their academic and daily lives?

Methodology

The data of this study which was performed in descriptive design has been collected by using semi-structured interview technique from among qualitative research methods. The researchers who are experts in the hearing impaired, language and speech disorders, communication, special education, teacher training fields firstly reviewed the literature, and the questions related to the use of sign language in sign language and educational environments were prepared. After that, they were submitted to the review of the experts; 2 from special education and the hearing impaired field and 1 from education programs field. The questions were restructured in accordance with the suggestions and the corrections of the experts, and turned into semi-structured interview form. 62 preservice teachers who are studying in four different departments (Guidance and Counseling, Primary Science Teaching, Computer Education and Instructional Technologies, Primary School Teaching) who had completed sign language education were interviewed. The study is limited to the opinions of the senior preservice teachers who are studying in the same faculty of education.

Participants

The study group of the research was determined in accordance with the maximum variation and criterion sampling from among the purposive sampling methods (Yıldırım & Şimşek, 2011). The criteria participating in the research as a willing volunteer and successfully completing the elective sign language course were taken into account.

The first researcher, who has been working as an academic member who has a doctoral degree in the special education field is an audiology and speech disorders specialist. She has been doing applied and clinical work in diagnosing, rehabilitating, and educating of hearing impaired individuals and sign language. The second researcher, who has been working as an academic member in special education field, has been continuing applied studies related to coeducation, general education and cooperation between the special education teachers, educational regulations in the general education programs, preparation of individualized education programs for the children with special educational needs in the inclusive environments, creative drama in special education and game.

62 preservice teachers who had successfully completed the elective sign language course program in 2015-2016 fall or spring term participated in the research. All preservice teachers were interviewed face-to-face. 11 questions in the interview form were asked in the same order, and the participants were allowed to express their opinions, adding details as they wish. The demographic information of the participants *related to age, gender, areas participants continue their education, sign language education information source, if there is a hearing impaired individual in the close environment or family, if they experienced sign language in their close environment before participating in the sign language course* is listed in Table 1.

Table 1
Demographic Information of the Preservice Teachers (n:62)

	Average±SD	Min-Max.
Average of age	22.37±0.79	21-25
Gender	F	%
Female	42	67.7
Male	20	32.3
Areas participants continue their education		
Guidance and Counseling	15	24.2
Primary Science Teaching	19	30.6
Computer Education and Instructional Technologies (CEIT)	18	29.1
Primary School Teaching	10	16.1
Sign language education information source		
Via a friend	11	17.7
Via Academic members and/or advisor of the department	5	8.1
Via personal course selection system	46	74.2
Is there a hearing impaired individual in the close environment or family?		
Yes	9	14.5
No	53	85.5
Did they experience sign language in their close environment before participating in the sign language course?		
Yes	22	35.5
No	40	64.5

As shown in Table 1, a majority of the participants, whose age ranged between 21 and 25, were women preservice teachers (67,7%). Of the 62 participants who had completed sign language course, 24% was from Guidance and Counseling, 30.6% was from Primary Science Teaching, 29.1% was from CEIT and 16.1% was from primary school teaching. Elective sign language course was found to be most frequently learned via personal course selection system (74.2%), friends came in second (17.7%), and academic members and/or advisor of

the department comes with the lowest rate. Besides, it has been seen that 14.5% has a hearing impaired individual in the close environment, 35.5% experience sign language in social life (in the subway, bus, university campus).

Data Collection Instrument

The data of the research was collected using semi-structured interview form which was prepared in accordance with interview technique (Bogdan & Biklen, 2007; Creswell, 2005; Yıldırım & Şimşek, 2011). An expert's opinion must be received from people who are experienced in the relevant field in order to express the questions more effectively in the use of the interview technique. These principles were taken into account in the preparation of the data collection instrument.

Data Collection Process

The research group consisting of 62 preservice teachers from the departments of Guidance and Counseling, Primary Science Teaching, CEIT, Primary School Teaching were chosen on a voluntary basis among the preservice teachers who had completed the elective sign language course in Ege University Faculty of Education in 2015-2016 academic year fall and spring term. Face-to-face interview sessions were conducted individually with every preservice teacher, the room of the academic member was used for this purpose. Each preservice teacher was interviewed 30 minutes in average.

Data Analysis

The perceptions and expressions of the preservice teachers were used as a baseline in the research. Descriptive analysis was conducted to analyze findings that reflected the opinions of the preservice teachers who had taken sign language course in a detailed and holistic way. The descriptive analysis in the qualitative researches is an analysis which consists of the participants' answers to each question and aims at expressing the similarities and differences between these answers (Bogdan & Biklen, 2007).

In data analysis, the conceptual frame of the research and the research questions were taken into account. Preparation, organization, and reporting stages in which deduction and induction methods were used together were pursued. The analyzed data were converted into themes as the context analysis. The findings were obtained by rendering conceptual structures and data into qualitative categories (Elo & Kyngas, 2008). NVivo program was used in the analyses of the data obtained from the research.

Preparation Stage: All written statements of the preservice teachers were analyzed. Each preservice teacher was given a coded number (i.e. P1) and the descriptive data were converted into writing in the interviewer comment and page comment sections. The preservice teachers were sorted by the departments they study, numbers used for the departments are as follows: P1-P15 for Guidance and Counseling, P16-P34 for Primary Science Teaching, P35-P52 for CEIT, and P53-P62 for Primary School Teaching. After this data was transferred to an electronic environment, the analysis stage was started. Thus, an online data list was made from the 62 preservice students' demographic information and answers to the questions from the interview form.

Organization Stage: The researchers firstly formed a conceptual frame by taking the research questions into account in this stage. Then, they decided which categories and themes the answers would fall under to conduct a holistic analysis. In the analysis of the data which had been transferred to the electronic environment and listed descriptively, similar data was organized and rendered by gathering under specific concepts and themes. First, the data listed descriptively was coded. The data obtained was grouped and matched under the related interview question. The researchers used the interview questions as a base in this stage.

Reporting Stage: The data of the study was simplified and associated and the codes were converted into themes. The data obtained were converted into qualitative statements and their percentages were calculated. The main purpose of this stage is to reach concepts and relations that will be able to explain the gathered data. The findings were written by directly citing the opinions of the preservice teachers in this stage. For the reliability of the research, reliability calculation between the coders was conducted. A high compliance between the coders shows a high scoring reliability. Reliability=[Agreement/(Agreement+Disagreement)]x100 formula

(Miles & Huberman, 1994) was utilized for the reliability and the reliability between coders was calculated as 90%. In accordance with this result, the research was accepted as reliable.

Findings

The opinions of the 62 preservice teachers participated in the research were described under 4 themes, 8 sub-themes and 98 occurrences (frequency). The themes and sub-themes developed as a result of the analysis are shown in Table 2 in the findings section.

Table 2
Themes and Sub-themes Related to the Elective Sign Language Course and Educational Practices

	f	%
1. Helpful in the daily communication process		
1.1. Opinions about the effect of sign language on the daily life	25	25.51
1.2. Opinions about use and confidence of knowing a language	18	18.36
2. Communication with the hearing impaired in the family and close environment		
2.1. Opinions about the positive contribution to the social life	3	3.06
2.2. Opinions about the studies on the sign language awareness	3	3.06
3. Necessity in social life-interest		
3.1. Opinions about that it will increase their own social participation in social life	12	12.24
3.2. Opinions about that it is a legal right for the hearing impaired individuals	7	7.1
4. Need for the academic knowledge and professional competency		
4.1. Opinions about the positive contribution of sign language use to the professional competency of a teacher	13	13.26
4.2. Opinions about the material use and the ability to make educational regulations based on individual awareness academically	17	17.34
Total	98	100

Table 2 explains that the percentage (%) calculated for each sub-theme is the status related to the elective sign language course on which the participants stated opinions most; the lowest % is related to the opinions and suggestions about the elective sign language course compared to other themes. 27 participants stated opinions on main theme *"helpful in daily communication process"*. However, 25 of 27 participants stated an opinion on the sub-theme *"Effect of the Turkish Sign Language to the daily life"*, and 18 participants stated an opinion

on the sub-theme *"Opinions about use and confidence of knowing a language"*. Secondly, 3 participants stated an opinion on the theme *"Communication of the participant with the hearing impaired in the family and close environment"*. These opinions were included in the sub-themes *"Opinions about the positive contribution to the social life"* and *"Opinions about the studies on the sign language awareness"*. Thirdly, 12 participants stated an opinion on the theme *"Necessity in social life-interest"*, all participants stated opinions on the sub-theme *"Opinions about that it will increase their own social participation"* while 7 preservice teachers stated an opinion on the theme *"Opinions about that it is a legal right for the hearing impaired individuals"*. Fourthly, of 20 people stated opinion on the main theme *"Need for academic knowledge and professional competency"*, 13 stated opinion on the first sub-theme *"Opinions on the positive contribution of sign language use to the professional competency of a teacher"*, 17 also stated opinion on *‘‘the material use and the ability to make educational regulations based on individual awareness academically"*.

As per the privacy of the opinions of preservice teachers, their names were coded while citing. Accordingly, the preservice teachers **who had taken the course** were coded "P", and every preservice teacher was given a number with their code letter. In this part, questions from the interview form were grouped in accordance with the sub-questions and findings were submitted.

When asked if they had a hearing impaired relative, P2, P3, P6 and P14 from Guidance and Counseling stated that they had a hearing impaired relative. When having a hearing impaired relative is associated to reason of enrolling in sign language course, participants’ reasons for preferring sign language course are as follow: P2 for helping the hearing impaired relative; P3 for supporting social participation, P6 for communicating with them; P14 for communicating with his relative and other hearing impaired individuals in the society. The preservice teacher who studied Guidance and Counseling had taken 3 hours of elective sign language course per week while the other preservice teachers had taken 2 hours of elective course. Table 3 shows the main themes developed from the opinions of the preservice teachers in accordance with the departments they study

Opinions about Turkish Sign Language

Table 3
Opinions of the Preservice Teachers in Accordance with the Departments They Study

Themes	Guidance and Counseling	Primary Science Teaching	CEIT	Primary School Teaching	Total
1. Turkish Sign Language is helpful in daily communication process	7	10	8	2	27
2. Communication with the family and close environment	1	2	0	0	3
3. Necessity in social life-interest	2	1	4	5	12
4. Need for the academic knowledge and professional competency	5	6	6	3	20
Total	15	19	18	10	62

As stated in table 3, of the 62 preservice teachers, 15 study Guidance and Counseling, 19 study Primary Science Teaching, 18 study CEIT, and 10 study Primary School Teaching. While 7 of Guidance and Counseling students, 10 of Primary Science Teaching students, 8 of CEIT students and 2 of Primary School Teaching students thought that sign language is helpful in daily communication process, 1 from Guidance and Counseling and 2 from Primary Science Teaching stated opinion about the contribution of sign language to the communication with hearing impaired individuals in the family or close environment. 2 from Guidance and Counseling, 1 from Primary Science Teaching, 4 from CEIT and 5 from Primary School Teaching preferred sign language course because of its necessity in social life and their interest. These students also believe that sign language is a legal right for the hearing impaired individuals and it will increase their own social participation. 5 from Guidance and Counseling, 6 from Primary Science Teaching, 6 from CEIT and 3 participants from Primary School Teaching stated opinion about the academic necessity for the sign language and its contribution to their professional competency. As a result, the preservice teachers preferred sign language because it will contribute to both their academic and social lives.

Opinions about the Sign Language Competency and Use in Daily Life

Table 4 shows the opinions of the participants about the use of sign language in daily life and the level of their competency in this field after taking the sign language course.

Table 4
Opinions of the preservice teachers about the use of sign language in daily life and their level of their competency in this field

	Guidance and Counseling	Primary Science Teaching	CEIT	Primary School Teaching
Use of Sign Language				
1. I haven't used sign language	11	13	11	10
2. I have used sign language	4	6	7	0
Competency Perception Related to Sign Language				
1. I used it with the hearing impaired/or in daily life	8	10	8	7
2. I can practice it when I meet a hearing impaired	7	9	10	3
When I become a teacher				
1. I can use it at school	11	15	15	7
2. No, I need to improve it	4	4	3	3

As stated in Table 4, some of the students except for the primary school teaching students stated that they used sign language in daily life after they had taken sign language course (Of all of Guidance and Counseling students, 11 used, 4 didn't use; of 19 Primary Science Teaching students, 13 didn't use, 6 used; of 18 CEIT students, 11 didn't use, 7 used). When their opinions about the sign language use in schools and their competency for using sign language are asked, 15 students from Guidance and Counseling stated that they could use sign language when they met a hearing impaired individual or to practice in daily life; 11 stated that they could use it at school when they became teachers. While all of the preservice teachers stated opinions as "*I have the competency to use sing language in daily life"*, it is remarkable that some preservice teachers stated that they needed to receive different education for the academic use. 11 from Guidance and Counseling, 15 from Primary Science Teaching, 15 from CEIT and 7 from Primary School Teaching stated that they could academically use sign language at schools. The opinions about the necessity for the teachers to know sign language at school is generally in accordance with the academic support dimension. Especially the opinions of the Primary School Teaching and Guidance and Counseling students are as follow: While P52, P54, P55, P56, P57, P58 from Primary School Teaching stated that the academic support related to the every field in childhood, so they should improve their competency to use sign language, Guidance and Counseling - P11, P13,

P15 stated that *"They think sign language use is highly important for the counseling process of the students, the hearing impaired students and the teachers can overcome the communication problems between them".*

Opinions about the Turkish Sign Language Education in Higher Education

The preservice teachers were asked to state their opinions about conducting sign language practices more systematically in higher education. The data obtained is described in Table 5.

Table 5
Opinions and Suggestions of the Preservice Tteachers about the Turkish Sign Language Education in Universities

Suggestions	Guidance and Counseling	Primary Science Teaching	CEIT	Primary School Teaching	Total
1. Applied/ intermittent education	5	11	7	6	29
2. Compulsory mutual course	10	8	11	4	33
Total	15	19	18	10	62

According to Table 5, a great majority of the group think that the sign language course should be a compulsory course. The students who think that the sign language should be included in the program regardless of the department and faculty stated that the courses should be conducted as applied and based on the skills intermittently. 10 students from Guidance and Counseling, 8 from Primary Science Teaching, 11 from CEIT, 4 from Primary School Teaching suggested that sign language should be a compulsory course. P38, P41 and P44 from CEIT stated that *"sign language is highly important for our department because while the teacher and the student need support for the technological literacy, this situation is more crucial for the students with hearing impairment. As our course is a course with visual richness, they can add theoretical courses first and applied courses then".* Besides, P38 stated *"it is a legal right for the students",* P44 stated *"sign language enable accessibility for the information and participation in the educational environments.*

The preservice students suggested to the students who have received sign language education in university to practice in general education schools (5 from Guidance and Counseling, 11

from Primary Science Teaching, 7 from CEIT and 6 from Primary School Teaching). Another important finding is that 16 of 18 CEIT students think that appointment priority to the deaf schools should be given to the teachers who are competent enough to use sign language in the courses.

Opinions about that the Quality of Sign Language Education in Higher Education Should be Improved

It was asked what kind of support should the academic members and the students in the universities receive to make the sign language educations more qualified and the data obtained is shown in Table 6.

Table 6
Opinions and Suggestions of the Preservice Teachers about the Sign Language Education Educational Regulations in Universities

For the academic member and the student	Guidance and Counseling	Primary Science Teaching	CEIT	Primary School Teaching	Total
1. A syllabus can be prepared	6	8	4	0	18
2. Appropriate environment Material support IE individual with video priority, technological support	9	11	14	10	44
Total	15	19	18	10	

As shown in Table 6, the preservice teachers drew attention that both the teachers who give the lesson and the students who take the lesson need support. Firstly, 18 preservice teachers stated that sign language course programs are needed, 44 stated that appropriate physical environment, material support, course videos, applied and technological support for the hearing impaired individuals should be provided.

In accordance with the findings of the study, for main themes were created: *"Helpful in the daily communication process", "Communication with the hearing impaired in the family and close environment", "Necessity in social life-interest" and "Professional competency"*. The answers of the participants to the questions were quoted under every theme title. The themes obtained as a result of content analysis regarding questions were shown in Table 2. Related to

the questions from the interview, each theme was described below by giving examples of the preservice teachers' opinions.

1-What are the opinions of the preservice teachers who attended to elective sign language course related to the effect of sign language on the communication process?

The question "What are the opinions of the preservice teachers who attended to elective sign language course related to the effect of sign language on the communication process?" was explained in accordance with the first theme. The theme "helpful in daily communication process" consisted of two sub-themes: *"Effect of the Turkish Sign Language to the daily life",* and *"Opinions about use and confidence of knowing a language".* 25 of 27 preservice teachers stated opinion on the sub-theme *"Opinions about the Effect of the Turkish Sign Language to the daily life"*, and 18 participants stated opinion on the sub-theme "*Opinions about use and confidence of knowing a language".* When the reasons for preferring sign language course, how they had heard about this course, how it affected the daily communication progress were asked, the mutual opinion of a great majority is that knowing and using sign language provide an advantage in social life (P2, P6, P8, P9, P11, P13, P14, P15, P17, P25, P26, P28, P29, P31, P34, P35, P36, P42, P43, P45, P47, P48, P52, P53, P54, P56, P57, P59, P61, P62). The preservice teachers stated that sign language supports the communication with the hearing impaired individuals. For example:

> *"My downstairs neighbor is a hearing impaired individual. I was able to say hello before. However, my mother came last day, I introduced my mother to that neighbor."* (Guidance and Counseling -P6)

> *"Yes, I have. The individual and the people around him create a sign language that they will be able to understand and they communicate that way. I usually talk to that person, too."* (Primary Science Teaching-P17)

> *"Doing activities that engage the different learning areas of the students in schools can contribute to the development of intelligence..."* (Primary Science Teaching 25)

The participants who preferred sign language to communicate with the hearing impaired relatives are followed by the ones who preferred it because they believed it would contribute

to the communication skills in social and professional life. The participants who stated that they were willing to learn a new language stated the reasons to prefer sign language as follow:

> *"I realized that I had been too insensitive about this issue while there were lots of people who had to communicate with sign language even though I didn't have hearing impaired individuals in my environment. I thought I could support at least these people and I chose this course."* (Guidance and Counseling-P9)

> *"I had always been willing to learn this language. When I see someone who uses sign language on the bus or on TV, I am curious about how they do that. To understand the worlds of the people who live with this impairment is the most important factor, I think."* (Primary Science Teaching-P33)

> *"I haven't met someone with hearing impairment yet but I think it will serve someday in the future and I will be able to help people."* (Primary Science Teaching-P17)

As can be seen, the students who took sign language course stated that they were willing to continue the course and they would be able to use it to communicate when they became teachers. They believe that they can support the hearing impaired individuals in daily life.

2. What are the opinions of the preservice teachers who attended to elective sign language course about the reasons to prefer sign language course?

What are the opinions of the preservice teachers who attended to elective sign language course about preferring the sign language course? The question was handled within the second and third themes. The second theme is *Communication of the participant with the hearing impaired in the family and close environment"* and consists of sub-themes "*Opinions about the positive contribution to the social life"* and *"Opinions about the studies on the sign language awareness".* A great majority of the participants who stated opinions on this theme explained that they refrained from communicating with the hearing impaired individuals when they meet them and they were not able to create a social environment for their hearing impaired friends in the school and dormitory life (P1, P2, P4, P6, P8, P9, P12, P14, P16, P17, P18, P21, P29, P34, P35, P36, P38, P39, P41, P42, P43, P44, P51, P52, P53, P55).

The statements of the participants who stated that their skills for starting and continuing communication in the environments with the hearing impaired individuals after they had started taking sign language course are:

> *"Realizing that I was able to meet with a hearing impaired people in a cafe and have a talk with him made me feel much better. I can say that it increased the number of my friends."* (Primary Science Teaching-P18)

> *"I think that my communication process was affected positively in the social life after I had taken sign language education. I refrained from communicating with a hearing impaired individual because I didn't know what to do when I meet them. But, after I took the course, I think that I will be able to communicate more easily."* (Primary Science Teaching-P29)

> *"I was not able to help hearing impaired people in social life because I didn't know sign language. I had a hearing impaired friend. I was not able to help him. Now, I try to have a talk with my hearing impaired friends and help them as much as I can."* (Primary Science Teaching-P34)

They stated that this situation increased their self-confidence to a higher level.

The third theme *"Necessity in social life-interest"* consisted of the sub-themes *"Opinions about that it will increase their own social participation"* and *"Opinions about that it is a legal right for the hearing impaired individuals"*.

A great majority of the participants who chose the course stated that the success in the communication process of a hearing impaired individual is not only limited to that person but the communication skills of the people with normal hearing are also important. The students stated that their communication skills were improved positively after they had learned sign language.

> *"Yes. My normally hearing friends were happy to learn some concepts I taught them. Actually, every individual wants to take this course. My friends in other faculties said that I was very lucky to take this lesson".* (Guidance and Counseling-P4)

> *"Yes, I had. I had a conversation with a hearing impaired individual in a cafe. A cafe in the university."* (Primary Science Teaching-P21)

> *"Yes, I had a friend when I went back to home. My friend has hearing impairment and I saw that I was able to use what I had learned, that made me so happy."* (Primary Science Teaching-P34)

The preservice teachers drew attention that they became more aware of their communication competency ad they start using sign language and they used gestures, facial expressions and body language more effectively. For example:

> *"I wasn't aware that the facial expressions were this effective before. I think that supporting the communication with gestures and facial expressions provides a more effective communication environment."* (Guidance and Counseling-P2)

> *"I see myself a step further than my other friends because they didn't take this course."(the quota for elective sign language course is limited to 20 people)"* (Guidance and Counseling-P4)

> *"My effectiveness in sign language use have been increased."* (Guidance and Counseling-P6)

The preservice teachers who believe that they contribute to the social awareness studies as they start taking the course stated that their close environment is impressed when they have an opportunity to practice sign language in daily life and they arouse curiosity. For example:

> "*I talk about the sign language skills I obtained in my social environment. The curiosity and interest for sign language have been increased in my environment. I have not met a hearing impaired individual yet. I would like to communicate with them if I ever meet them."* (Guidance and Counseling-P8)

> *"I realised the importance of gestures and facial expressions and I used them much more in daily life."* (Guidance and Counseling-P9)

> *"I try to sing every song I hear with the sign language. Besides, I try to translate the words I hear into the sign language and it is very nice to teach it to my friends who don't know this language."* (Guidance and Counseling-P14)

The participants who stated opinions about that being able to use sign language both in social life and as a preservice teacher is a richness stated that the teachers who know sign language should have the appointment priority for the deaf schools (P35, P36, P37, P38, P39, P41, P42, P43, P44, P45, P46, P47, P48, P49, P50, P51, P52), that they believe it will be effective in supporting the academic and social participation especially when teaching the children (P52, P53, P54, P55, P56, P57, P58, P59, P60, P61, P62).

3. What are the opinions of the preservice teachers who attended to elective sign language course about the use of Turkish Sign Language in educational environments?

4. What are the opinions of the preservice teachers who attended to elective sign language course about the effect of sign language on their vocational career?

5. What are the opinions of the preservice teachers who attended to elective sign language course about their competency for using the Turkish Sign Language in their academic and daily lives?

The research questions numbered 3, 4 and 5 were described under the fourth theme. The fourth main theme *"Need for academic knowledge and professional competency"* consists of sub-themes *"Opinions on the positive contribution of sign language use to the professional competency of a teacher",* and *"the material use and the ability to make educational regulations based on individual awareness academically".*

When the preservice teachers were asked about the sign language education in universities, they stated opinions about the mutual syllabus, written and printed materials, technological support, media support, duration of the course and its context. The preservice teachers who think that the right to education is as important as the right to live, mentioned that sign language courses shouldn't be only given in the faculty of education, it should be also taught in other departments and faculties of the higher education institutions. About the regulations related to the courses and the support that will be provided:

> *"More technological support can be provided. We can study with the micro education plans. In this way, we can realise our deficiencies more easily."* (Guidance and Counseling-P9)

> *"Students should be encouraged, the courses should be introduced more."* (Guidance and Counseling-P12) *"*

> *"The number of the courses should be increased, it can be taught with in-service training, courses should be opened, the students should be encouraged and the usage data should be multiplied and stimulated"* (Psychological Guidance and Counseling-P14)

> *"The price of the sign language books should be appropriate and the books should be popularized. More sign language teachers should be trained"* (CEIT-P44)

> *"Sign language should be practiced with the hearing impaired individuals and the schools for deaf should be visited"* (Primary School Teaching-P56)

These participants also mentioned that it is necessary to provide technological support in order to prepare clear, understandable and practical course materials, publish a TV channel that broadcast in sign language in universities, prepare enriched content practices and to include local and national projects (P1, P2, P3, P4, P7, P8, P9, P12, P14, P17, P19, P20, P21, P24, P25, P30, P31, P32, P33, P35, P36, P44).

The participants who stated that the sign language courses contribute to the teacher's competency (P7, P9, P10, P11, P13, P14, P23, P26, P27, P31, P32, P33, P43, P53, P54, P56, P61, P62) think that the competency for sign language use should be improved. For this reason, they drew attention to the popularization of course books, program and materials and making them appropriate for the users. They also stated that related digital content should be included in the mobile phones, i-phone and tablets, applications related to sign language should be created and these applications should be recorded and monitored in the ethically (P3, P5, P6, P9, P11, P12, P13, P14, P19, P20, P21, P22, P23, P24, P25, P26, P31, P32, P33, P34, P35, P36, P37, P38, P39, P41, P42, P44, P45, P46, P48, P49, P50, P51, P52, P53, P54, P55, P56). Related to sign language use:

> *"Of course I am going to use it if I need to. I have to practice for the competency. I can improve it with practice."* (Guidance and Counseling-P7)

> *"Of course I think of using it in an environment it is necessary. Also, I can improve it an become a sign language instructor."* (Guidance and Counseling-P14)

> "*I think. Especially if I have a hearing impaired student, I will be more interested in it."* (Primary Science Teaching-P17)

> *"I would like to use it in an appropriate environment. I see myself competent."* (Primary Science Teaching-P18)

> *"I think of using and teaching it."* (Primary Science Teaching-P27)

> *"Yes, I think. I taught everything I learned to my family and the people around me. Because of the awareness, I searched for the words (unknown) I was curious about. This course became permanent with frequent repetitions and I see myself as competent."* (Primary Science Teaching-P33)

> *"Yes, I am going to use it in the school I am appointed. I see myself competent. I would be good for not forgetting it."* (Primary Science Teaching-P34)

> *"I think it can be expanded to two terms instead of being a one-term course. Because I need to practice more."* (Primary Science Teaching-P26)

These participants also emphasized the need for the practicing sing language. The participants who think that using sign language will improve the communication and effective teaching skills of the teacher believe that they will make a professional difference in the classes in which sign language is used (P7, P14, P17, P18, P19, P21, P23, P26, P27, P28, P29, P31, P34, P38, P39, P39, P41). Related to the sign language education:

> *"The possibility of meeting someone with hearing impairment on the road or having a hearing impaired student, and the possibility of not being able to communicate with them or not understanding them made me want to learn this language."* (Primary Science Teaching-P33)

> *"No. Because this is not directly related to any faculty, department or field and every department should have the capacity and the opportunity to take this course"* (Guidance and Counseling-P7)

> *"I think it should be included in every field, just like Turkish language, besides, even though it is not taught in detail, it should be taught within the basic communication skills."* (Guidance and Counseling-P14)

> *"It should be taught to different departments in accordance with the different field knowledge. Because the terms used by CEIT students may not be used by the* Guidance and Counseling *department students. But, in fact, it would be beneficial to learn the terms used in the other fields in order to have an idea about every subject."* (CEIT-P43)

Another important finding is that the preservice teachers think that sign language should be a compulsory course in the higher education institutions (P1-15 and P53-62 (all students) from Guidance and Counseling and Primary School Teaching, P16-P25 from the Department of Science and all students from CEIT except for P37-P38P52). In accordance with the compulsory course regulations, they stated that the sign language course should be given in at least two academic terms as 1st or 2nd year (Guidance and Counseling P1, P2, P3, P4, P6, P7, P8, P9, P10, P11, Primary Science Teaching P17, P18, P19, P20, P28, P29, P32, P33, P34, CEIT P35, P36, P39, P40, P41, P42, P43, P44 and all students from Primary School Teaching), without a quota limitation (Primary Science Teaching P17, P18 and Primary School Teaching P42) and it should be ***"Basic Sign Language"*** in one term, and

"Professional Sign Language" in the other term. The preservice teachers also think that the sign language education should be started at early ages, it can be given as "Basic Sign Language Education" at the educational level, "Basic Sign Language Education" in universities and "Professional Sign Language Education" in the internship period and when they start teaching. The students stated that practice durations should be increased especially in the education, communication and medical faculties and the academic members should be trained among the specialists who teach in the faculty in which the course will be given.

Results and Discussion

Opinions of the preservice teachers who attended elective sign language course were described in a total of 98 sub-categories related to their reasons for choosing sign language course, effect of the sign language on the communication process, use of sign language in educational environments, its effect on their vocational career, their competency to use sign language in their academic and daily lives The data obtained from the interviews consists of four main themes: *"Turkish Sign Language is helpful in daily communication process", "Communication of the participant with the hearing impaired in the family or close environment", "Necessity (interest) for the Turkish Sign Language" and "Academic Efficacy of the Turkish Sign Language".* According to the opinions that created this themes, the reasons for participating the sign language course differs for the preservice teachers, the main reason is especially the need for education and to use it effectively in social life.

The preservice teachers who stated that the social media advertisements impressed them with the increase in the interest for the sign language in the society think that it contributes to the hearing impaired individuals and the individuals who use sign language in terms of interpersonal interaction, effective use of sign language and sense of confidence. Pıştav-Akmeşe (2016) reached a similar finding in the study conducted with 190 individuals who had enrolled in a basic sign language certification program. In the study in which the sign language education and the competency of sign language teachers were examined; The participants stated that use of sign language increased social participation in social life, making sign language use widespread would increase the employment of hearing impaired

individuals in public and private enterprises and institutions. These findings are thought to be highly important in our day in which the type of professional knowledge and skills that will be taught in teacher training programs and after-graduation competency are discussed. Thus, communication skills of teachers, how they use body language and their self- confidence are effective on their academic performance. The preservice teachers who mentioned that the sign language educations should be given in the schools in the scope of a certain plan and program emphasized the contribution of knowing sign language to the individuals with normal hearing. It is thought to contribute to starting interpersonal communication and using the body language effectively in social life. Besides, they stated that a cooperation should be between the family, school and teacher; sign language is highly important in the learning environments. Another finding that draws attention as much as the opinions about the social effects is that use of sign language in the schools will provide academic support for the hearing impaired students. While all preservice teachers participated in the study think they were competent to use sign language in daily life, some of them stated that they needed to improve themselves for academic usage competency. This result states that giving a skill-based education in the undergraduate programs of the faculty of education is as important as the academic knowledge.

The first theme *of the study* **"Helpful in daily communication process"** *consists of sub-themes "Effect of the Turkish Sign Language to the daily life", and "Opinions about use and confidence of knowing a language".* The participants who handle helpfulness of sign language to the communication under *"usage in social life and academic use"* dimension suggested that the course should be compulsory for higher education in order to improve academic use competency. They stated that the course should be included in at least 2 terms, content should be prepared for professional use, it should be enriched in terms of the course book and educational material. The students who stated that it could be included in every department and faculty as a compulsory course suggested that the courses should be applied. By drawing attention to the importance of that the preservice teachers who have received sign language education in universities should practice in general education schools, they suggested that there should be appointment priority for the teachers who actively use sign language to the schools for the deaf. They also stated that the characteristics such as the education level, reasons for participation, the field of usage, profession type, status of participating in another course before taking the sign language course in higher education are

important. This finding matches with the finding which stated the sign language should include both the theoretic and application dimensions intensely, the education level of the students should be determined by taking their field of study into account (Pıştav-Akmeşe, 2016).

As can be seen, the preservice teachers who stated that the sign language should be taught at early ages believe that the use of sign language in schools will be able to increase both the social and academic participation of the hearing impaired individuals. The results of the studies conducted on hearing impaired individuals and the individuals who directly communicated with hearing impaired individuals from different ages and areas showed that sign language came first in the communication preferences of hearing impaired adults who were deaf from birth and had been educated in a school for the deaf and was of vital significance. (Hayes, Geers, Treiman & Moog, 2009). The sign language use of the hearing impaired individuals who couldn't benefit from early intervention auditory verbal education opportunities is nearly 100% in communication (Parlak, 2011). It is important to teach sign language at early ages just like normal language education. In the study which examined the interaction of hearing impaired individuals in the family and sign language use related to language development, it has been stated that the parents communicate with the hearing impaired children less than the normally hearing children and shows less verbal approaches. Usage of American Sign Language in a home where English was spoken increased parent children interaction, supported it positively and the family made a progress in creating common meaning (Blackburn, 1998).

The second theme of the study is "***Communication of the participant with the hearing impaired in the family and close environment"*** and consists of sub-themes *"Opinions about the positive contribution to the social life" and "Opinions about the studies on the sign language awareness".* The opinions stated under this theme are related to the effect of sign language to the communication, social interaction processes. The participants stated that they became more aware of their communication competency when they started learning sign language and they used gestures, facial expressions and body language more effectively. In the literature, the attention was drawn to the relation between sign language knowledge competency, usage and effective communication. It has been stated that the children who had grown up in families where sign language was used could express their feelings better and

had a higher level of confidence in their communication (Gongora & Farkas, 2009; Vallatton, 2008). Felzer (1998) drew attention to that teaching sign language to the children with normal hearing as a second language contributed to their social development and communication skills positively. This finding matches with the opinion that the sign language education of the preservice teachers contributes to their own social lives. Vallotton (2009-2011) stated that the children could understand the behaviors of the adults more easily and quickly in environments where sign language was used. On the other hand, most of the adults who had enrolled in sign language courses thought that knowing and actively using sign language affected their professional development positively and would be an advantage in social life. Each individual has the option to start, continue and finish communication. Most of the people attending to sign language course are hearing impaired individuals and they feel uneasy to start communication with the individuals with normal hearing as they think they won't be able to be understood. When viewed from this aspect, making sign language use widespread can affect the communication starting attempts of the hearing impaired individuals positively (Pişтav-Akmeşe, 2016).

In the third theme, the preservice teachers evaluated sign language education in accordance with ***"opinions about increasing participation in social life and a legal right for hearing impaired individuals".*** In the literature, it has been stated in the studies which drew attention to the relation between hearing aid use and education that it is necessary to diagnose the hearing impairment early on, implement a hearing aid as soon as possible and start education to enable hearing impaired individuals to gain spoken language and speech skills effectively (Akın et.al, 2009; Geers et.al, 2008; Pistav-Akmese & Acarlar, 2016). When these needs are not met, many of hearing impaired individuals isolates themselves from the society and a great majority of them do not benefit from social services as their ages increase (Parlak 2011). Although this condition is tried to be avoided by the legal regulations such as sign language use, widespreading it, including it in educational environments, the researches on awareness, acceptance of the disabled individual and attitude change clearly show that the individuals with and without disability live in the different areas of the society. It has been thought that making sign language widespread in different environments would be positive for the hearing impaired individuals. Examples of the researches conducted related to the participation of hearing impaired individuals to the social life, obtaining services, communication preferences, tracking processes in employment and medical services and

which support this opinion can be seen in the literature (Gürboğa & Kargın, 2003, Koennigsfeld, Beukelman & Stoefen-Fisher, 1993; Parlak, 2011; Pıştav-Akmeşe, 2016).

Sign language is one of the communication methods the hearing impaired individuals often prefer. It has been stated that they demand help from the people who know sign language firstly to get over a problem they face and they communicate more easily in the environments in which sign language is used (Parlak, 2011). When it is asked to the executives of two factories in which 156 hearing impaired individuals were employed how they hire the employees who have hearing lose they draw attention to the importance of sign language by saying: *We show them around the factory before employment. We show them the process conducted in the departments. We pay attention to that they work in the departments they want. They prefer the departments in which many hearing impaired individuals work."* When the same executives were asked how they communicate with the hearing impaired employees, they said: "If we realize that we cannot communicate with the hearing impaired employees by writing and lip-reading, we get help from the employees who use sign language actively." (Parlak, 2011). Gürboğa & Kargın (2003) stated that hearing impaired individuals often used sign language with their family, while shopping, in public transportation, in work to understand communication and express themselves. In another study, the opinion of the preservice teachers about increasing the hours of sign language course in higher education institutions is supported by the literature. Pıştav-Akmeşe (2016) included the opinions of the people who had received sign language education into the research. The participants who think that it is difficult for any individual to have to express themselves draw attention to that hearing impairment makes people isolate themselves from the society. The participants mentioned that it was important to use sign language with the hearing impaired individuals in daily life and they stated that the sign language can be improved by practice as well as receiving an education. *In the same study, the relationship between the increase in the sign language usage and the social media is remarkable. A great majority of the people who participated in the education stated that Turkish Radio and Television Corporation (TRT) and other national channels should cooperate with the Ministry of National Education for the hearing impaired individuals. They especially suggested the cooperation of the academicians who work in the fields such as special education, linguistics, audiology, otolaryngology, language and speech therapy with the personnel who work in the service sector in the departments such as cartoon and animation,*

visual design, graphic, media consultancy in order to eliminate the lack of written and visual materials in schools. The course materials can be prepared clear, understandable and with a fluent language, visually enriched content can be included. With the improvement of materials based on technology, sign language acquisition in early period can be easier. The programs prepared can be made widespread via mobile phones, i-phones, i-pads and digital devices. The materials which will be prepared by taking the characteristics of the age group into account are thought to be able to contribute to the regulations related to the learning and teaching in schools.

In this study, the opinions about the effect of sign language in daily life and learning environments were examined as *"academic support, educational regulations, course content and material usage"*. In the literature, when the communication preferences of 12 hearing impaired university students between the ages of 17-22 (all of whom had hearing aids at late ages and had not received special education), it was stated that the people the young individuals received help in solving their problems used total communication based on lip-reading, written and verbal language in addition to knowing sign language very well (Parlak, 2011). This result explains the importance of making sign language usage widespread in higher education in social and academic sense. Because the hearing impaired adults often use sign language with their family members, while shopping, in friendship, in work to understand communication and express themselves (Gürboğa & Kargın, 2003).

In a study conducted by Erting Kuntze et.al (2002), interaction of the 60 hearing impaired children who had been observed at home until the age of 5 with the 6 normally hearing and 5 hearing impaired teachers in the school environment was examined. It was stated that studying with the teachers who had a good command of sign language when they started the school program significantly affected the academic success and improved their communication and social skills and the children benefited from book sharing activity using sign language and they gained self-confidence and social skill competency. While the children tended to communicate with the hearing impaired teachers more often in the school courses at the beginning, they started to get close to the teachers with normal hearing but who used sign language as time progressed. It was stated that sign language contributed to learning and teaching the curriculum to the children with sign language provided a basis for academic and social success in adulthood. It is highly significant to provide better education

opportunities for the hearing impaired adults and to include them in the society as teachers in order to make them active preservice teachers of the programs to be prepared and applied. They stated opinions about that the preservice teachers who received sign language education should be included in the education of the hearing impaired individuals in the education programs. It is seen that including hearing impaired individuals in the educations is significant for both increasing the effectiveness of sign language programs and uniting people. In the literature there have been opinions related to that the families, preschool teachers and primary school teachers should participate in the sign language educations and be educated about early diagnosis, communicating with children and observation techniques (Gongora & Farkas, 2009; Vallotton, 2009); children's learning sign language as a second language is based on the effective and right use of sign language by the adults around them (Goodwyn & Acredolo, 1993; Felzer, 1998; Gongora & Farkas, 2009). The quality of the sign language education is related to the competency of the sign language teacher. The preservice teachers stated that the education should be given by the specialist academic members who taught in the departments they studied. They also stated that the teacher should have the theory and practical knowledge related to linguistics, special education, education of the hearing impaired individuals and communication, the postgraduate departments related only to sign language should be opened as well as giving sign language courses on the undergraduate level. So, they underlined that the experts who will be able to work in this field can be chosen from among the educated people who graduated from at least undergraduate or postgraduate programs. It can be seen that the adults who had completed "Basic Sign Language Certification Program" in institutions other than a higher education institution have the similar opinions. Pıştav-Akmeşe (2016) stated that an instructor who teaches sign language should have at least bachelor's degree and take lessons in the fields of adult education, educational psychology, language and expression, using Turkish in an effective and right way, spelling rules. It can be said that the sign language education given in both higher education institutions and other enterprises and institutions should be given by experts under a mutual program.

This study has a great importance because it will be able to contribute to the theories and practices. The opinions of the preservice teachers related to that sign language education should be given by the experts of the field under a program based on scientific and up-to-date information. This result requires a discussion on determining the quality of the

programs that will be prepared for sign language education and what kind of competencies sign language teachers should have. However, there have not been any programs which teach Turkish Sign Language (TSL) at universities in our country; but as of 2013, it has begun being added to hearing impaired teaching programs as a compulsory course and to some undergraduate programs as an elective course (Kemaloğlu 2014b). Turkish Sign Language became a language which was recognized by Grand National Assembly of Turkey, taught in various courses and universities as an elective course in 2014 though it was late. It was included in the compulsory courses of Special Education Teaching Department in the second class in the 2016-2017 academic year. Many researchers from different fields have been interested in this language and started conducting various projects. It became an elective course for all departments of Ege University Faculty of Education in 2015-2016 academic year and a sign language dictionary was brought in the field by the students of CEIT with the project *"Hearing hands and seeing eyes"* (www.konusanelerduyangozler.com/). Besides, with a project which was supported by the Ministry of Family and Social Policies, *"Turkish Sign Language Linguistics Book"* was prepared by Dikyuva, Makaroğlu & Arık (2015) and studies for the Turkish Sign Language model dictionary have been continuing (http://eyh.aile.gov.tr/). Zeynep Oral's "Translation of Turkish Sign Language" book is the book in the literature related to the sign language translation (Oral, 2016).

Another characteristic of the study which was thought to be important is the opinions of the preservice teachers related to the usage competency for sign language in terms of daily life and professional career. 62 preservice teachers who are studying in four different departments (Guidance and Counseling, Primary Science Teaching, Computer Education and Instructional Technologies, Primary School Teaching) who had completed sign language education stated what kind of practices were needed to use sign language in their professional career related to the departments they studied in and that the methods for effective use of sign language should be taught. This result shows similarities with the opinions of the participants who had completed and were still continuing sign language education certification program by Pıştav-Akmeşe (2016). The preservice teachers stated in the study that sign language education was not transferring sign language education by an educator based on only one education program. Besides, opinions about having materials for practice, their will for being and active user in the social life during the program, that findings should be created by taking the level

of education they were receiving or had received into account, that the practices should be transferred into videos and that the teachers can evaluate students with these videos match with the findings in the study of Pıştav-Akmeşe (2016).

The opinions of the preservice teachers who participated in the study about the sign language education are grouped around mutual syllabus, written and printed course materials, technological support, media support, course duration and content. In this sense, the opinions of the preservice teachers who will be responsible for the education of hearing impaired individuals are important for the curriculum and other materials which are prepared by the Ministry of National Education. On the other hand, the preservice teachers think that the teachers who know sign language and will be able to use it in the education process effectively should have appointment priority for schools for the deaf. So, it is mandatory to evaluate the sign language use and application skills of the teachers in accordance with certain criteria. The application skills of the teachers can be evaluated by the commissions which would consist of the academicians from linguistics, hearing impaired teaching, special education fields in the pre-service period. As another step, the teachers can be told that they should take the preferences of the hearing impaired students and families into account about the usage of sign language during the courses. It should be born in mind that sign language is only one of the practices in the education process and the education of the hearing impaired students can be supported by various educational regulations.

For example, the applications related to sign language can be placed in mobile phones, i-phones and tablets as digital content; these applications can be used by the children for the review of the course in the time out of school. User and duration details can be recorded, they can be monitored by the teacher or family and ethical measurements can be taken.

Another result is the relationship between receiving sign language and competency of the teacher. The preservice teachers stated that the first characteristic they expect from a qualified sign language education program was that it should contribute to the communication skills, effective use of gestures and facial expressions.

As a result, all these findings show that sign language course is adopted by more preservice teachers in the education faculties day by day, they are willing to learn it and think that it will

be able to contribute to their professional competency. Besides, sign language being known by the teachers is of great significance for the hearing impaired students to communicate effectively with the ones who use sign language, to become independent and productive individuals in the society as it supports the hearing impaired students and increase their academic success and life quality.

Suggestions

The preservice teachers think that we should attach more importance to sign language education programs in higher education institutions. They stated that studies should be conducted to enrich the program in terms of the course book and visual materials, and to train personnel who will be able to give the course. Some suggestions were developed based on the results obtained from the research. These are:

The preservice teachers who had chosen the course for both social and academic use stated that sources and materials were required in order to study after the course. Mutual studies can be conducted and materials can be prepared related to the sign language course program in universities.

The sign language course should be compulsory and the weekly course hours should be divided into practice and theory in order to make sign language education more effective. Besides, mutual studies should be conducted with the field specialists from the faculty or from different faculties and departments such as Linguistics, Medical Faculty, Department of Otolaryngology, Audiology, Faculty of Communication, Radio, Motion Pictures and Television, Media Design Department for the quality of the materials and educational programs.

Sign language being given by the academicians will affect the communication skills, competency for the sign language use of the teachers and the quality of sign language education programs. In this regard, the sign language courses must be certainly given by the academicians who know sign language. The hearing impaired individuals should be frequently invited to the courses and an environment for the practice of sign language should be created.

During the sign language course period, a cooperation should be provided with the public and/or private schools and associations for the deaf in order to provide an opportunity to practice for the students. Application protocols should be made between the universities and the Ministry of National Education in order to enable preservice teachers to use sign language at schools.

By repeating this research which has the feature of being the first in terms of subject and purpose with other preservice teachers, results that are convenient to make generalization can be obtained.

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Research Article

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Opinions of School Administrators about Accountability in Educational Organizations

Abstract

The aim of this study is to examine the opinions and suggestions of school administrators about school accountability. The study, a qualitative research, was designed with phenomenological research model. The participants of study consisted of 10 school administrators selected by using maximum variation sampling. Data of the study were collected through semi-structured interview form and were analyzed with content analysis. The results showed that school administrators define the concept of accountability by using such terms as explaining reasons, transparency, asking for the results of assignments, responsibility of informing, having the sense of responsibility. School administrators stated that a good school accountability system will probably have positive results such as guiding students' choice of profession, , increasing success, increasing school's popularity among students and parents, revealing present situation of the school and contributing to the modernization of the society. Besides, administrators had suggestions to establish amd improve accountability in schools such as increasing participation, informing stakeholders, increasing awareness about accountability by training people, defining

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legal responsibilities, clarifying the standards, recording and storing information and documents, and evaluating performance.

Keywords: *Accountability, accountability in educational organizations, school accountability, school administrators*

Introduction

Educational organizations are significantly affected by general management approaches and practices, and handling these organizations in systems approach framework characterizes them as social and open systems, which, in turn, provides schools with a set of new and complex functions and features. Social systems consist of individuals, and interrelated sub and upper components, each of which significantly contributes to the whole (Özalp, 1992, p.296). Open system emphasizes multidirectional relationships between educational organizations and environment (Küçükali, 2011, p.53), and makes some components such as family participation or stakeholder variety current issue within educational management. Despite being a subcomponent of public administration and sharing general principles and approaches with public administration, educational management has a different working style with respect to its own typical features (Özdemir, 2013, p.2). Educational organizations aim to fulfill specific aims as in the other organizations. Schools, which are the implementation step of the education systems, can be stated as the institutions that work in accordance with the aims of education system. In this regard, it is possible to state that the aims of the school can be shaped in the direction of the aims of the education system (Bursalıoğlu, 2013, p.6). However, educational organizations are different from other organizations in terms of the variability in schools' working process, target output, and evaluation process (Bayrak, 2013, p.11). The reason of the difference is that the active factor in basic resources, output, and process of the schools is human beings (Bursalıoğlu, 2013, p.33). Any problems in the working process of the schools, which educate human resources and shape the future of the society, or any problems inhibiting to reach expected quality, may result in irreversible outcomes.

According to 2013-2014 statistics, the total number of pre-school, primary, secondary, high and vocational-technical public schools within the Ministry of Education are about 81 thousand. The number of students having education at these schools is about 17.5 million and the number of teachers working in these institutions is about 950 thousand. In 2015, the rate of the budget of the National Ministry of Education in GNP (Gross National Product) is 3,19% and the share is 13,11% in overhead cost (MEB, 2015). The numbers and rates show that National Ministry of Education is the biggest organization in Turkish public organizations and takes the biggest share of the budget. Being the biggest organization and taking the biggest share of the budget, Ministry of Education is responsible to many people and institutions in

terms of accountability, which makes the term accountability an important concept (Bülbül, 2011, p.1).

The concept of accountability is evaluated as an important result of new public administration approach which is gained importance in the world after 1970s, especially in 1980s (Hood, 1995). The changes and regulations in new public administration also affected Turkish public administration system. Public institutions and organizations were reorganized with reference to the new public administration approach through law amendments and regulations enforced especially after 2000s. Public Finance Management and Control Law no: 5018 which proposed the establishment of Internal Audit Office within the scope of Ministry of National Education was legislated in 2003. It can be accepted as an important development in terms of drawing attention to the crucial concepts such as public transparency and accountability of the new public administration approach (Arslan, 2010, p.29).

Accountability is defined as to demonstrate that the work has been done appropriate with pre-determined rules and standards and to report the results and outcomes of the work honestly and openly (UNDP, 2008). Accountability concept which refers to administrators' taking responsibility in the framework of basic rules and standards about organizations activities and outcomes of these activities serves to protect the benefits of all the stakeholders (Samsun, 2003, p.19). Accountability concept has mutual relationship and similar meaning with expectations and responsibility. According to this view, organizations' or administrators' responsibilities to reach success or usage of the resources or their responsibility of effectiveness and success expectations of the people and institutions in formal or informal environment determine the framework of accountability and define how administrators should account (Rhoten, Carnoy, Chabran & Elmore, 2003, p.4). Briefly, accountability can be defined as the responsibility of the individuals to give an answer to the other individuals or groups.

Hopkins (2007, p.101) defined accountability as an integrative concept with controversial meaning and function as process oriented or product oriented accountability and internal/external accountability. This viewpoint distinguishes accountability from control and inspection systems found in traditional administration approach, and makes it much more complex structure to understand, define and implement. The importance of accountability in organizations causes it to be analyzed in different areas and makes the definitions and content of the accountability more complex (Acar, 2013, p.383). Being such an important concept for

the organizations, accountability is generally accepted as closely associated with organizational effectiveness concept (Hoy & Miskel, 2010).

Accountability in education is generally taken as the success of students and the school as a whole (Linn, 2003, p.3; Lunenburg & Ornstein, 2013, p.184). Accountability criterion of school principals is seen as achieving pre-determined success standards of schools (Fraine, Van Damme & Onghena, 2002). Accountability criteria on educational organizations are generally evaluated as abstract because there are not sufficient regulations about the issue, there are problematic parts of accountability implementations on educational organizations (Özdemir, Bülbül & Acar, 2009) and there are not sufficient researches about accountability in educational organizations (Kantos & Balcı, 2011).

Accountability in education systems can be expressed as a school-based system in terms of being accountable to all stakeholders who are within immediate or surrounding environment of the school (Ladd & Zelli, 2002, p.495). To increase the cooperation of school-parent and environment, to establish parent-teacher associations, to ensure the participation of society in schools through law and regulations, to improve the relationship between school-parent and society, to evaluate the performance of teachers and school administrators and so on can be accepted as the basic intended measurements to establish accountability in educational organizations. For example, to define the qualifications of the teachers may be a basic improvement in order to establish an accountability system within the frame of the teachers' qualification.

The Concept of Accountability

It is possible to summarize the concept of accountability with the question of "who is responsible to whom for what?" The "who", in this case, is the person who will be accountable about what s/he has done and the "whom" is the person having authority to be accounted (Adams & Hill, 2006, p.218). Accountability includes the process, answering the questions related with usage of resources, obtained outcomes, organizational effectiveness and productivity (O'Day, 2002, p.293-294).The concept of accountability means that individuals or organizations are responsible for their actions in the eyes of a specific authority and informing this authority about the results of these actions (Edwards & Hulme, 1996, p.967). Broadly, accountability can be defined as the responsibility to make an explanation or

responding to the stakeholders about the actions of individuals or organizations (Gül, 2008, p.73). In other words, accountability may be defined as being evaluated of authorities or the agents to whom the resources have been allocated according to pre-determined standards and the demands of the stakeholders (Ebrahim, 2003, p.815).

In order to explain the implementation process of accountability, there are two types of accountability approaches; accountability according to its structure and accountability according to its quality. Accountability according to its structure is classified as "upward and horizontal accountability". Upward accountability can be defined as a process, regulating the questioning, answering, and flow of information processes between the citizens and the government. This process describes the situation of government's being accounted for all the matter concerning citizens. The means by which the government is accountable to the citizens are elections, non-governmental organizations and media. Horizontal accountability means that the government accounts to the institutions and organizations, which are responsible for the control and inspection of the government (Gül, 2008, p.76-77).

Reviewing the literature about the concept of accountability and examining the implementation of accountability, it is seen that the concept has a close relationship with responsibility, transparency, and ethics (Bülbül, 2011, p.19). Responsibility can be characterized as a cover term that includes accountability. However, the scope of responsibility is not limited to the concept of accountability. Although being accountable is the concept requiring compliance with authority, taking responsibility refers a behavior including much more autonomy (Uhr, 1993, p.4). Moreover, responsibility not only refers to authority, power and task but also taking responsibility of one's own acts (Cendon, 2000, p.25). Transparency, a necessity and complementary term for accountability, points to openness in decision-making or implementation of individuals or organizations. Transparency provides a number of beneficial outcomes such as accountability of the organizations as well as cooperation and building trust (Jahansoozi, 2006, p.943). Regarded as an internal control mechanism in ensuring accountability, ethics helps to reveal the individuals or organizations that take responsibility for their own acts or decisions, behave honestly and openly in sharing knowledge, and do not abuse the authority they have (Eryılmaz & Biricikoğlu, 2011, p.33-34).

In the literature, accountability is analyzed within various classifications. O'Day (2002, p.294), stated that types of accountability are evaluated as administrative/bureaucratic, legal, and

professional or market accountability. On the other hand, Cendon (2000) classified accountability in political, administrative, professional, and democratic accountability. Political accountability refers not only to the accounting of the administrators extending hierarchically to the top positions of the administration such as President of the Government but also to the responsibility of the Government to the Parliament. Administrative accountability refers to being accountable to superior administrators and external stakeholders about abiding legislative regulations. Professional accountability is associated with following the rules or norms of a profession and taking the responsibility to comply with the standards of the profession. Democratic accountability refers to being responsible to public directly and performing the responsibility of proactive transparency to the citizens (Cendon, 2000, p.28-42).

Accountability in Educational Organizations

Accountability in educational organizations means giving information or making explanation to the internal or external authority about the performance or it means the necessity to legitimize the decisions or implementations. The responsibilities of educational organizations for the goal-oriented practices and resources used while doing the practices also emphasizes the accountability (Cendon, 2000, p.25). The most important outcome of the educational organizations for which they have the responsibility of being accountable is the quality of educated individuals. The achievement or failure of these individuals, and their role and behaviors in society determine the success or effectiveness of educational organizations and schools are expected to be accountable for these outcomes. Accountability in education tries to determine to what extent educational organizations reach the prescribed aims and to increase the quality and success of students (Koçak, Turan & Aydoğdu, 2012, p.124).

There are three kinds of accountability in educational organizations. These are legal accountability which refers to abiding the legislative regulations, professional accountability which refers to following professional norms, and finally product oriented-accountability. Educators generally deal with three types of accountability systems simultaneously (Anderson, 2005, p.1). The first type of accountability acquired by inspection and supervision is about whether the school is functioning properly according to the legislation made by the Ministry of National Education. It is possible to evaluate this type of accountability as legal

accountability. Schools being accountable to top management and using inspection mechanism in this process is also called as administrative accountability (Samsun, 2003, p.21).

The second dimension of the accountability at school is professional accountability. Professional accountability emphasizes the decisions and implementations made within the professional standards and principles (Cendon, 2000, p.39). It also refers to the expectation of educational organizations that educators should behave in accordance with the norms of the profession. Professional accountability requires educators and administrators being accountable for commitment to professional standards and principles, and accountable to their peers (Anderson, 2005, p.1-2). The efforts of Ministry of National Education to define the professional competence of the teachers in the Turkish Education System and various norms shaped in accordance with the unions can be considered as some of the practices which are applied to establish professional accountability.

Another dimension of the accountability in educational organizations is product-oriented accountability. This dimension focuses on the results obtained at the end of the educational process such as student learning, their success, and their progress. Product-oriented accountability raises the level of political impact on educational organizations. For example; "No Child Left Behind" practice adopted in the United States, where accountability mechanisms are more advanced in education, can be accepted as one of the product-oriented accountability systems. This practice focuses on the success and progress of each student. Product-oriented accountability system signifies that educational organization should be accountable for student learning and student success to public (Anderson, 2005, p.2). This dimension which is called as product-oriented accountability in educational organizations can be also called as democratic accountability. Democratic accountability represents that performance indicators and outcomes of the public institutions and organizations can be controlled directly by the citizens. Moreover, democratic accountability signifies the responsibilities of public institutions and organizations within the scope of "new public administration approach" in terms of giving information about the objectives, practices and obtained results to the citizens, so it emphasizes that the public institutions and organizations should be proactive while sharing information with the citizens (Cendon, 2000, p.42). It is possible to state that the practices of democratic accountability in schools requires important stakeholders such as parents and others in the schools' environment to participate in the school administration. With the practices of democratic accountability, parents will get information

about their children's learning, success, progress, and the usage of school resources etc. and will participate in decision-making process about the necessary improvements in the school.

The scope of accountability in educational organizations also consists of decisions of the teachers and school administrators to achieve predetermined objectives, their practices to reach these predetermined objectives and other instruments such as equipment, methods, and techniques to provide and sustain student success (Kalman & Gedikoğlu, 2014, p.116). It can be said that school administrators are responsible for defining objectives, developing success standards and cooperating with teachers, parents and other stakeholders in order to reach predetermined goals. School administrators are also responsible for communicating openly and constantly with internal and external stakeholders in the process of determining vision, mission, and strategy by discussing such issues as to what extent the objectives are achieved, what kind of problems are faced, and what kind of precautions are taken to solve the problems.

The importance of accountability in educational organizations can be specified clearly by considering the effect of "new public administration approach" on the educational administration and educational organizations, and the share of the educational system in public arena and educational organizations' unique characteristics. The fact that schools with open system characteristics have intensive interaction with their environment, that all the social systems and various pressure groups have political, ideological, religious, economic, cultural etc. expectations from schools, Besides, the function of raising next generations and the concept of "children" give schools a large number of roles and responsibilities. These roles, responsibilities, and expectations require schools to be accountable to a number of persons and institutions in terms of inputs, processes and outcomes of the school.

Previous studies showed that school administrators and teachers do not internalize and comprehend the concept of accountability precisely, which is a part of "new public administration approach". The accountability is perceived as being accountable to superiors and tends to stay within the boundaries of administrative and political accountability (Cendon, 2000). There are several reasons pointing the importance of accountability in educational organizations and the necessity to improve it, which are centralized structure of Turkish Education System (Özdemir, 2010, p.4) conflicting with the new public administrative approach, strong political impact on educational decisions (Özdemir, 2013), and students' failure especially in international exams (EİR, 2014).

Besides necessities in practice, when the local literature on accountability in schools analyzed, it is seen that there are researches aiming to determine accountability politics of teachers and school administrators (Erdağ, 2013), to develop an accountability model based on the opinions of teachers and school administrators (Ertan-Kantos & Balcı, 2011), to find out the degree of internalization and practicality of different dimensions of accountability by teachers and school administrators (Özen, 2011), and to evaluate the effects of teacher accountability on student success (Salduz, 2013). Although school administrators were consulted about their opinions in these studies, no holistic analysis of their suggestions were noted with respect to the reflection of accountability in practice, evaluation of its possible outcomes by the practitioners, and maintaining and sustaining accountability. In this regard, it is concluded that there is a need of applied research to determine the degree of comprehension, internalization and implementation of accountability in schools, which would fill an important gap in the literature and in the education system. This study aims to determine the opinions and suggestions of school administrators about accountability in schools.

Method

Design

This study was designed with phenomenological research model which is one of the qualitative research methods. Phenomenological design focuses on phenomena known but not deeply understood. Any kind of concept, experience, perception or situation may be a phenomenon. (Yıldırım & Şimşek, 2011, p.72). Because individuals may attribute different meanings to these phenomena, subjectivity of individuals' comments or perception underlie phenomenological studies. Phenomenological research tries to explain how individuals perceive, describe, and evaluate a set of phenomena or what they feel about these phenomena. Briefly, phenomenological studies try to reveal how individuals make sense of a phenomenon which they have experienced (Patton, 2014, p.104-106). Phenomenological research design has been used in this study because the study investigates how school administrators make sense of accountability which is closely related with them in administrative processes, and what their suggestions are to improve accountability in schools.

The Participants

The participants of the study are in total 10 principals and vice principals working at primary, secondary and high schools in Tepebaşı and Odunpazarı central districts of Eskişehir in 2014 to 2015 academic year. The reason why the school administrators are the participants of the study is that phenomenological design necessitates a participant group who have experienced this phenomenon directly (Creswell, 1998, p.118; Patton, 2014, p.104). While choosing the principals and vice principals of the study, maximum variety sampling method was applied. The main aim of maximum variety sampling method is representing maximum variety in features of the individuals who are a side and data source of research problem (Yıldırım & Şimşek, 2011, p.108). All the participants were chosen based on voluntariness and their names were not used in any phase of the study. The demographic features of the participants are given in Table 1.

Table 1
Demographic Features of Participants

Participant	Gender	Age	Seniority in management	Educational Status	Position	School Level
1	Male	43	14	Master degree	Principal	Secondary school
2	Male	36	10	Bachelor degree	Vice principal	High school
3	Male	48	12	Master degree	Principal	Primary school
4	Male	39	5	Bachelor degree	Vise principal	Primary school
5	Female	46	15	Master degree	Principal	High school
6	Male	45	16	Master degree	Principal	High school
7	Male	41	18	Master degree	Vice principal	High school
8	Male	41	5	Bachelor degree	Vice principal	High school
9	Male	47	4	Bachelor degree	Principal	Primary school
10	Male	27	2	Bachelor degree	Vice principal	Primary school

As seen in Table 1, the participants of the study show variety in terms of gender, age, seniority in management, educational status, position and school level. Literature review, field expert opinions and informal interviews with relevant persons showed that these variables affected the description and interpretation of the investigated phenomenon. In this context, 9 of the school administrators are males while one of them is female. Half of the participants are principals while the other half are vice principals. 5 of the participants have Bachelor Degree; and the rest of them have Master degree. The age of the participants ranges between 27 and 48 and their seniority in management ranges between 2 years and 48 years.

Data Collection Tool

Semi-structured interview form was used as data collection tool of the study. Semi-structured interview enables researchers to perform systematic and consistent data collection procedure with questions prepared in advance. In addition to that, semi-structured interview enables researchers to get in-depth knowledge about the issue with probe questions (Berg, 2009 p.107). While preparing the interview form, the literature on the concepts of accountability and accountability in educational organizations were examined and opinions of field experts were taken into consideration. Additionally, draft of the interview form was prepared after an informal interview was used with a school administrator. 6 open-ended questions were formulated in draft questionnaire. The interview form was put into its final form according to the feedback taken from 2 experts working at the Department of Educational Management, Inspection, Planning and Economics. As some of the questions overlapped each other and some did not serve the aim of the study, it was decided to 3 open-ended questions in the form according to expert views. The experts stated that it would be enough to ask three questions compatible with the aim of the study which won't limit the answers of participants. They also stated that probes would be beneficial to obtain in-depth knowledge about the issue. To increase internal validity of the study, relevant literature was examined in detail and conceptual framework was taken into consideration while preparing interview form. Semi-structured interview questions formulated with the expert opinions are as follow:

1. How do you define school accountability?
2. What do you think about the outcomes of school accountability?
3. What do you suggest to establish and improve accountability in schools?

Data Collection and Analysis

Before the interviews, voluntary principals and vice principals were called to take an appointment. During the interviews, the participants were primarily asked demographical questions to define their demographic features and then, they were asked open-ended questions found in the data collection form. Interviews lasted for about 25-30 minutes. At the end of the interviews, the participants were asked extra questions to understand the rationale of their answers and to get in-depth information, if necessary.

Content analysis technique was used in the data analysis procedure. Content analysis is the data reduction and interpretation approach to determine fundamental consistencies and meanings in any qualitative data (Patton, 2014, p.453). In content analysis, similar themes, patterns, and concepts are identified and classified under related themes. And thus, conceptions and relations which will help to explain qualitative data are discovered (Yıldırım & Şimşek, 2011, p.227). NVivo 10 qualitative data analysis software was used in data analysis procedure. The analysis was done independently by two researchers. First of all, the qualitative data were segmented and coded, and then, these codes were classified under some specific themes. The answers of the each question were classified under the broad themes created for each research question. Therefore, the analysis process was carried out with an inductive approach based on discovery of each pattern, theme, and category in the qualitative data. At the last phase, the data analysis results discovered independently by two researchers were compared and discrepancies and consistencies were discussed to reach a consensus.

Validity, Reliability, and Limitations of the Study

In order to provide validity and reliability of the study, a number of precautions were taken. To provide internal validity, the local and foreign literature about the issue was reviewed in detail and field experts were consulted about their opinions in the process of form preparation. Pre-interviews were done in order to establish trust between the participants and the researchers in data collection process and to encourage the participants of the study for stating their opinions freely. The participants were notified that their names would not be used in any phase of the study, and all necessary explanations about the research topic and aim of the study were done during pre-interviews. After the transcription of the data, the transcriptions were submitted to the participants and confirmation was received. To provide external validity of the study, research design, the participants, data collection, and analysis process were explained in detail. Besides, direct quotations were included while presenting findings of the study. To provide reliability of the study, an informal interview was done with a school administrator to make necessary revision regarding the data collection tool, and so all the precautions were taken to prevent any problems which could emerge during the interview. Both of the researchers participated in the interviews as much as possible. The data were analyzed independently by two researchers, and then, the researchers negotiated on discrepancies and consistencies to reach the findings of the study. In order to calculate consistency of analyses done independently by two researchers, calculation formula suggested by Miles and Huberman (1994) was used.

The consistency of the analyses done independently by the two researchers was found as .87. Each step of the study was explained in detail, and the data and data analysis documents of the study are kept to enable other researchers' examinations.

The most important limitation of the study is that the results of the study cannot be generalized to the population. One of the most important reasons of this situation is that in order to do an in-depth analysis in qualitative studies, the number of the participants is kept low. Due to the nature of qualitative study, the results of the study are limited to the participants who reflected the ideas, and it cannot be concluded that the same results are valid for other school administrators. Another limitation of the study originated from the number of participant female administrators. While creating study group, it was aimed to ensure variability of the school administrators in terms of gender; however, only one female administrator could be interviewed while 9 male administrators participated in the study. The reason of this important limitation is that female school administrators are few in number compared to male school administrators in Turkey, and the number of volunteer male participants was more than that of female school administrators.

Findings

Findings of the study are presented under three sub-heading coherently with the sub-questions of the study. In this regard; the findings are presented under sub-headings called as school administrators' opinions for the concept of school accountability, school administrators' opinions on outcomes of school accountability and school administrators' suggestions to establish and improve accountability in schools.

Opinions for the Concept of School Accountability

The first sub-question of the study aims to examine the definitions of school administrators for the concept of school accountability. For this sub-question, the answers of school administrators, given to interview questions, were analyzed. The findings obtained from analysis are summarized in Table 2.

Table 2
School Principals' Definitions for the Concept of School Accountability

Definitions of School Accountability
Explaining reasons of the work intended to make
Transparency (both in and out of the school)
About financial issues
About educational issues
About student success
Being inspected of the works
Retrospective questioning and inquiry
Responsibility of informing
Having the sense of responsibility
Soul-searching within inner self

As seen in Table 2, participant school administrators define the concept of school accountability with terms as explaining reasons, transparency, being inspected of the works, responsibility of informing, having the sense of responsibility and soul-searching within inner self. It is especially emphasized by school administrators that the transparency in financial issues, in educational issues and in student success are the crucial parts of accountability. Some of the statements used by school administrators while defining school accountability are as below:

> *"Accountability means being controlled of our works. It should be carried out by an inspection committee. Individuals should not be allowed to manage with his/her own rules. They should obey the existing rules." (P-2)*

> *"It reminds the transparency. Being transparent both in organization and out of the organization. I don't think that it is only related with financial issues. It is needed to become transparent to the parents, about educational issues. "(P-3)*

> *"We mostly refer to making student success accessible for everyone…" (P-5)*

> *"It means a person's soul-searching about student-related issues and giving account of the work which is being done and whether the school is successful or not to the teachers, parents and the government." (P-9)*

Opinions on the Outcomes of School Accountability

The second sub-question of the study aims to determine the outcomes of school accountability according to the opinions of participant school administrators. For this sub-question, the answers of school administrators, given to interview questions, were analyzed. The findings obtained from analysis are summarized in Table 3.

Table 3
School Principals' Opinions on Outcomes of School Accountability

Outcomes of School Accountability
Guiding students' choice of professions
Increasing the number of study and activities
Increasing success
Improving the quality of education
Informing all members' about their roles and responsibilities
Directing energy to the right works
Increasing school popularity
Increasing trust level of families
Increasing motivation of the school personnel
Revealing the present situation of the school
Having the opportunity of comparison with other schools
Revealing the educational situation of the school
Identifying which works have been completed and which ones have not
Contributing to the modernization of the society

As seen in Table 3, school administrators believe that the possible outcomes of school accountability will be positive for the school. School administrators indicate that the possible outcomes, which will come with school accountability, are guiding students' choice of professions, increasing the number of study and activities, increasing success, increasing school's popularity among students and parents, revealing present situation of the school and contributing to the modernization of the society. Increase in success level is being associated with improving the quality of education, informing all members' about their roles and responsibilities and directing energy to the right works by school administrators. Increasing school's popularity is being interpreted as a positive situation which will increase trust level of families and motivation of the school personnel. Revealing the current situation of the school is seen a way of having the opportunity to compare the school with other schools, revealing the educational situation of the school and identifying which works have been completed and which ones have not yet. Some of the statements used by school administrators for the outcomes school accountability are as below:

> *"Irregularity arises at schools which are not inspected. We store all the documents which the Ministry of Education demands. Accountability shows success and necessitates success." (P-2)*

> *"If accountability is implemented everybody knows what to do and how to do. Otherwise, they spend their energy to people and works about which they don't need to be accountable. If they focus on accountability, success increases because they know that they will have to give an account of success or fail." (P-3)*

"It makes school more preferable. School personnel become happy, peaceful, their motivation increases and they produce more." (P-4)

"It takes out our educational Picture" (P-6)

"First of all, trust of stakeholders is gained. When this trust is gained, demands from these stakeholders are provided unconditionally. Chaos is prevented. Questions in minds disappear." (P-10)

Suggestions to Establish and Improve Accountability in Schools

The third sub-question of the study aims to determine the suggestions of school administrators for establishing and improving accountability in schools. For this sub-question, the answers of school administrators, given to interview questions, were analyzed. The findings obtained from analysis are summarized in Table 4.

Table 4
Suggestions of School Principals to Establish and Improve Accountability in Schools

Suggestions to Establish and Improve Accountability in Schools
Participation and informing
Pressure of parents, educational unions and non-governmental organizations should be increased
Participation of parents and other stakeholders should be ensured
Training for gaining awareness
Personality development
Leadership
• Persuasion and communication skills
Educations for students, parents and school environment
• Right to get information
Educations for school principals and teachers
• Obligation of accountability
Defining legal responsibilities
Inspection committees must be organized
• Must be objective
• Must consist of experts
Complaints should be handled at Ministry
• Evaluators should be in the profession of education
Clarifying standards
Rules, standards, responsibilities and processes should be clear
Should be valid for everybody
An accountability system, purified from political impacts, should be constituted
• Accountability of whole system instead of personal accountability
Evaluating performance
Rewarding system should be constituted
• School principals should have power to reward
Capabilities of human resources should be determined
• Right job for the right person

As seen in Table 4, the suggestions of school administrators can be summarized under the titles as increasing participation, informing stakeholders, increasing awareness about accountability

by training people, defining legal responsibilities, clarifying the standards, recording and storing information and documents, and evaluating performance. For increasing participation and informing stakeholders, school administrators emphasize increasing the pressure of parents, educational unions and non-governmental organizations on the schools and ensuring the participation of parents and other stakeholders. In the context of increasing awareness by training people they mention about educational activities which will increase the awareness of responsibility for accountability of teachers and school administrators and other educational activities for leadership development and personality development. Another aspect of awareness education is related with training students, parents and other stakeholders about their rights to get information. In terms of legal responsibilities, inspection activities to increase school accountability are emphasized by school administrators. They also indicate that the complaints about the school or school personnel should be handled at Ministry level to ensure the objectivity of the inspections, evaluators should be in the profession of education and the mentioned inspection committee should be objective and consist of experts. In regard to clarifying standards, school administrators mention about clarifying rules, standards, responsibilities and processes, making them valid for everyone, clarifying the responsibilities of all school members beforehand and purifying the implementation process from political impacts and personalized sanctions. According to school administrators, it is important to archive all the information and documents related with works, processes and activities of the schools, to set up online system for these documents and to set up social networks which make easier to access information about school success, school personnel and school activities establish accountability in schools. Lastly, school administrators state that to initialize performance management system, based on prior determined capabilities of human resources and constituted rewarding system in the school, will increase the sense of responsibility for accountability of school personnel. Some of the statements used by school administrators to establish and improve accountability in schools are as below:

> *"Accountability is a social problem. The pressure groups such as parents, unions, non-govermental organizations should be increased." (P-1)*

> *"There is a system to which the informations about parent-teacher association is entered regularly. This system causes principals to behave consciously. It can be developed such online systems through which principals account for society, parents and students regularly." (P-3)*

> *"I think there should be such a system that we enter the all data of our school regularly like e-school, MEBBİS. Even it will be better, if we can take monthly or yearly summary of these data so we can see our statistics. For example after a*

teacher makes analysis, he/she must enter the results of the analysis in the system… How much electric and water do we spend? All of these information should be seen. We actually enter these informations into the system of Ministry, they know them. However, this system should be a system visible for everyone. I should have the opportunity of seeing other schools' expenses, success or teacher related information as which kind of in-service training they have had or which school they graduated from. Everbody could be able to see and know these kind of things." (P-5)

"Number of inspection made by government must be increased, but it must be rational, If government makes the inspection objectively, accountability increases. An accountability system, balancing the pressure between government, society and non-govermental organizations, must be set up" (P-9)

Results, Discussion and Suggestions

This study aims to determine the opinions and suggestions of school administrators about accountability in educational organizations. The overall results of the study indicate that participant school administrators think that accountability is beneficial for educational organizations and they emphasize that school accountability is crucial for success and school accountability should be improved. School administrators who participated in this study mostly explain the concept of accountability as related to the concept of responsibility. When school administrators describe the concept of accountability, they focus on transparency, justification of actions and inspection of works as well as responsibility. When the definitions of accountability are examined in the literature, it is possible to come across such definitions: "to account to some authority for one's actions" (Jones, 1992, p.73 cited in Mulgan, 2000, p.555), "to explain whether an action is done as required" (Yıldırım, 2006, p.5), "to explain one's own actions" (Scott, 2000, p.40), "to account for actions and obtained results" (O'Day, 2002, p.293-294), "to be held responsible for what's done" (Edwards & Hulme, 1996, p.967). In this regard, it can be concluded that the statements used by the school administrators while defining the concept of accountability correspond to definitions found in the literature. Moreover, the statements of the school administrators show that accountability concept is mostly associated with the concepts of responsibility, transparency, and inspection. When the concepts that are associated with accountability in the literature are investigated, it is observed that responsibility, transparency, and inspection concepts are sometimes used as closely related with accountability, sometimes used interchangeably, and sometimes used as the dimensions of accountability (Bülbül, 2011; Hatch, 2013; Koppell, 2005; Yıldırım, 2006). It is also

observed in the literature that the concepts of answerability (Hatch, 2013; Koppell, 2005), and ethics (Eryılmaz & Biricikoğlu, 2011, p.34) are also used in relation with the accountability concept. From the statements used by school principals while defining accountability, "making explanations about the reasons/justifications" may be evaluated in the concept of "answerability" and "soul-searching within inner self" may be evaluated in the concept of "ethics". Because accountability is a complex concept and possesses different dimensions and a number of definitions, school administrators associated it with different concepts while defining. In this regard, school administrators broadly define accountability concept the way that is used in the literature although they focus on different dimensions or give priority to different aspects of the concept. One of the important reasons of this situation can be accepted as having no specific and clear standards about accountability in Turkish education system (Özdemir et al., 2010).

The result of the study signifies that participant school administrators indicate that the possible outcomes of school accountability will be beneficial. These beneficial outcomes indicated by participant school administrators are guiding students' choice of professions, increasing the number of study and activities, increasing success, increasing school's popularity among students and parents, revealing present situation of the school and contributing to the modernization of the society. The studies focusing on the consequences of accountability in the literature also show that establishing accountability generally has positive outcomes. In his study of examining accountable leadership in schools, Elmore (2005, p.135) stated that schools which have achieved to establish an internal accountability mechanism would be more efficient organizations. Reback (2008) analyzed the effects of school accountability on the distribution of student achievement and concluded that enforcements imposed to schools as a result of accountability had positive effects on students' test scores. Similarly, Chiang (2009) suggested that enforcements imposed to schools as a result of accountability increase the time spent by the school on instructional technology, curriculum development, and teacher development and they increase student achievement. In the study conducted by Kalman & Gedikoğlu (2014) it was concluded that there is a high positive correlation between school administrators' accountability level and teachers' perceptions on organizational justice. High organizational justice perceptions have positive effects on individuals' behaviors and their commitment to schools (Babaoğlan & Ertürk, 2013, p.89). As indicated in previous studies, it is possible to state that accountability has an important contribution to school achievement and maintenance of order in schools. Even though, the positive contributions of establishing accountability to

both stakeholders and organizations are overemphasized, it is also stated that focusing on accountability more than necessary can create a dependency culture and reduce professional autonomy (Hopkins, 2007, p.42). Therefore, it can be indicated that implementing accountability with a strict inspection approach and pressure would have some negative consequences such as blocking creativity and innovation, and following the rules strictly rather than taking risks, which, in turn, would create problems for adapting to change. School administrators who participated in this study did not mention these possible negative consequences of accountability found in literature. The reason of this situation may be that accountability has not been completely established in Turkish Education System yet. So school administrators focus on the problems arising from not having a properly working accountability system and touch on positive consequences arising from establishing a reasonable level of accountability.

The results of the study reveal that school administrators make numerous suggestions to establish school accountability. One of the suggestions of the school administrators to establish school accountability is about the necessity to define rules, to determine responsibilities, and to set standards specifically which will be valid in implementation of accountability process. Standards lie behind the concept of accountability. Accountability refers to a set of standards for improving the quality of organizations and evaluating behaviors of organizations in the framework of these standards (Biricikoğlu, 2011, p.8). In this regard, accountability in education means setting the educational standards which should be implemented by administrative units of schools and it also means being certified and shared the results related to achieving level of these standards with public by schools. A study conducted by Goodwin, Englert & Cicchinelli (2003) demonstrates specific standards and expectations as the basic elements of effective accountability systems. Hence, the suggestions of the school administrators related to setting specific standards are very important in terms of making Turkish Education System accountable.

School administrators mentioned the necessity of performance evaluation to establish accountability in schools. Being a complex and dynamic concept, accountability may be defined as being evaluated of authorities or the agents to whom the resources have been allocated according to pre-determined standards and the demands of the stakeholders (Ebrahim, 2003, p.815). In this regard, one of the most important dimensions of accountability is performance evaluation of the organization and organization members in order to define to

what extent the standards are met. Performance evaluation depends on defining standards clearly and measuring the expected results. Therefore, in order to establish accountability in organizations, specific performance criteria should be set to determine whether the results meet the expectations or not (Sayıştay, 2001, p.7). It can also be stated that determining these criteria in advance contributes to job share in accordance with the competences and abilities of organization members.

Performance evaluation not only determines the current situation of the performance but it also requires taking incentive precautions to increase the performance of the individuals. It is also emphasized in efficient accountability systems, intrinsic and extrinsic incentives should be given to those who obtain successful results. According to Lingenfelter (2003, p.23) who stated that rewarding is one of the common elements of efficient accountability systems; the balance of intrinsic and extrinsic incentives should be optimal for a successful accountability system. Although intrinsic rewards such as focusing on meaningful aims, determining development level, and measurement have positive contributions, extrinsic rewards should not be ignored. Because it is not possible to increase success level of organizations where a good result is not rewarded. Similarly, Anderson (2005, p.2) stated that school accountability systems consist of five basic components as objectives, assessments, instruction, resources, and rewards or punishments. The school administrators who participated in this study also proposed to form a rewarding system based on the performance evaluation to establish accountability in schools. In this regard, accountability, which is defined as "an obligation that people will be held responsible for their actions and containing reward/punishment component" (Burke, Sims, Lazzara & Salas, 2007, p.617), should be structured in accordance with a rewarding system in order to establish it influentially in educational organizations. However, it can be stated that the reasons such as inadequacy of pre-determined objectives in educational organizations and being bound to a rewarding system based on seniority rather than educational outcomes cause a limitation in the variability and number of incentives in accountability systems of educational organizations (Kirst, 2000, p.327).

Another suggestion of school administrators is providing parent and environment participation in schools and informing them. In the literature, one of the important and common elements of accountability systems is stated as their ability in terms of informing students, parents, and teachers (Englert, Fries, Martin-Glenn & Douglas, 2007, p.3). The point that should be taken into consideration is that information about student and school progress should be presented

understandable to all interested parties. Besides, considering the complexity of educational processes, all interested parties should be included in the process of establishing school accountability properly which contribute to improve educational performance (Lingenfelter, 2003, p.23). It is emphasized that school administrators bear the most important responsibility (Ertan-Kantos & Balcı, 2011, p.130) for providing parent participation in schools, which is accepted as one of the most crucial indicators of school effectiveness (Rosenblatt & Peled, 2002, p.349). According to the results of the studies examining the situation in Turkey in the context of parent participation in schools, demands of parents for financial accountability are higher (Polat, 2007, p.185). Parents' financial participation by supporting schools for various activities and services financially ensures schools to be more accountable in this dimension (Yolcu, 2007, p.236-237). From this point of view, it can be concluded that providing parent and environment participation, and informing them is a requirement to establish accountability in schools.

Another suggestion of school administrators to establish and improve accountability is closely associated with transparency, one of the requirements of accountability. Transparency, defined as presenting the objectives of organization, politics to reach the objectives, and required knowledge to monitor the outcomes of the politics systematically, understandable, consistently and reliable, is accepted as an important element by school administrators to establish accountability (Demirkıran, Eser & Keklik, 2011, p.177). School administrators suggested archiving all the documents, setting up online system, and social networks that makes accessing schools easier in order to present required information to the stakeholders of educational organization and interested parties and to perform information and document management efficiently. Considering that administrators of accountable schools are aware of their responsibilities, present clear and in-depth information to the stakeholders when necessary, and they are able to answer any question regarding their schools, (Kalman & Gediklioğlu, 2014, p.117), these suggestions can be deemed significant in with respect to improving schools' accountability. Right to Information Act, Law #4982, was legislated in 2003 in Turkey, and subsequently relevant basis and procedures were put into practice in order to enable citizens to benefit from this Law in accordance with the principles of equality, objectivity, and clarity, which are building blocks of any democratic and transparent management (Resmi Gazete, 2003). However, studies indicate that there is no public demand regarding right to information, that the law has not been internalized fully yet. The reason of this situation is that the public does not have the required awareness to make the most out of this law (Atamtürk, 2009).

Consistently, school administrators suggested that student, families and others in the school environment should be trained to raise their awareness about Right to Information Act. In this sense, one can conclude that it is necessary to inform the stakeholders accordingly in order to establish transparency since there is no public demand for information from the educational organizations either like other organizations.

This study aims to determine school administrators' opinions and suggestions about school accountability. Conducting comparative studies across countries where accountability systems function efficiently at educational institutions may be of great value in terms of analyzing accountability at schools multi-dimensionally and to produce guidelines for the process of establishing accountability system at schools. Besides, to evaluate the outcomes of school accountability properly, it can be suggested to conduct such studies as comparing the school images of a school with efficient accountability system and another one with a poor or no accountability system at all or studies as examining the impacts of an efficient accountability system which makes school accessible for stakeholders on school success. Based on the results of the present study, following practical suggestions can be made: informing stakeholders about their rights and responsibilities within accountability system; conducting activities to increase family and public participation in schools; and making school accessible for the stakeholders with an online system that allows easy access to all necessary information and documents.

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Research Article

Development of Three Dimensional Virtual Court for Legal Education[1]

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Abstract

The aim of this study was to develop a three-dimensional virtual court for legal education. The study was carried out as qualitative research, and design-based research method was used in the study. The participants were composed of 4 lawyers, 6 legal practitioners and 5 researchers. Study data were collected by using document analysis, focus group discussions and unstructured interviews. Two focus group discussions were held throughout the study implementation In the first discussion, the participants were informed about potential beneficiaries and purposes of using of virtual courts. The other discussion became the venue for negotiations on how to transfer the structure and functioning of real courts to the virtual environment. In addition, document analysis was conducted on functioning and physical

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properties of the real courts in Turkey. In the light of the findings from the focus group discussions in combination with document analysis, the qualities were determined which are expected to be featured in a virtual court to be developed for legal education. In the following stage, a three-dimensional virtual courthouse was modelled where hearings can be held. Then it was revised in accordance with opinions of both experienced and legal practitioners by using unstructured interview forms. The court was finally finished as a result of a two-step evaluation process.

Keywords: *Virtual court, virtual reality, legal training, three-dimensional modelling*

Introduction

The use of up-to-date information and communication technologies in class has always been worth investigating for educators. Virtual reality technology is one of them. Virtual reality refers to the real-like virtual environments created based on the laws of physics (Winn & Bricken, 1992). With virtual reality applications in which various senses are actuated, users can not only watch the screen from the screen but also live as if the reality is in that world (Çavaş, Huyugüzel Çavaş, & Taşkın Can 2004; Spence, 2008; Uzun, 2011). Virtual reality environments allow real-time movement, navigation and touching of objects to users (Chen, Yang, Shen, & Jeng, 2007). Sound and image sensitive heads, motion sensitive clothes, gloves and cabinets are some of the technologies used to create virtual reality (Dede, 2010).

Virtual reality has created its own virtual cultures and communities. Virtual worlds are communities where virtual reality is revealed. Damer (2008) defines the virtual world as *"reflection of dreams created in space with pictures or words and the places that give enough sense of that world"*. In virtual worlds, users are represented by virtual characters that can move. These characters, called avatars, can interact with each other and with virtual objects in the environment. There are virtual worlds developed by different companies. Active Worlds (AW), Kaneva and Second Life are examples of these (Kamalı, 2012).

Recently, there have been studies investigating the use of virtual reality and virtual worlds in learning and teaching processes. The studies comparing traditional classroom environment with virtual one (Edirisingha, Nie, Pluciennik, & Young, 2009; Omale, Hung, Luetkehans, & Cooke-Plagwitz, 2009; Salmon, 2009; Warburton, 2009) suggest that the feeling of existence and belonging in the virtual environment is higher than that of the traditional classroom environment. Simultaneous communication in the virtual environment has a motivating effect on students (Holmberg & Huvila, 2008; Omale et al., 2009). According to Arıcı (2013), the academic achievement of students studying in the virtual world is higher than in traditional classrooms, and the information gained is more permanent. There are studies that show that students are more comfortable in virtual classrooms than traditional classroom environments (Singh & Lee, 2009; Wang, Song, Xia, & Yan, 2009). According to Winn (1995), the use of learning environments in which virtual reality is supported is now a necessity. Such environments are said to provide positive contributions to the students such

as playing active roles in the process, promoting productivity, imagining, learning with fun and developing positive attitudes towards the lesson (Winn, 1995).

Although the use is increasing day by day, there are some limitations of the three-dimensional learning environments created by virtual worlds. The number of educators to develop a qualified virtual learning environment is low and the platforms to be used in this process require high cost (Kluge & Riley; 2008). It is also known that designing content and objects for use in three-dimensional learning environments is not easy ((Smelik, Tutenel, de Kraker, & Bidarra 2011). Considering users, students have the potential to share inappropriate content, as well as technical problems such as internet access and hardware shortcomings (Inman, Wright & Hartman, 2010; Liou 2012; Nash, 2009). According to Hinrichs, Hill, & Patterson (2011) it is possible that virtual worlds can be transformed into a genuine community by solving the mentioned problems.

Legal Education and Virtual Learning Environment

Demirağ and Çiftçi (2010) state that legal education in Turkey has been a subject of debate for many years and that it is considered inadequate against international standards. In particular, there are debates about the duration of basic legal education. Öztürk (2010) points out that over seven years have been spent to train lawyers in many developed countries. Criticism about basic legal education in Turkey is not limited to the duration of education. In most of the law faculties there are inadequacies in service building, classrooms, library, technical equipment, and academic and administrative staff (State Planning Organization Undersecretariat, 2014). Kılıç (2009) concluded that importance is given to the application as well as the transfer of theoretical knowledge within the legal education system abroad, that the internship periods are equal to or longer than the university education; whereas in our country, mainly theoretical education is applied and the internship training period is shorter in Turkey. According to Başözen and İyiler (2010), in the center of the criticisms about the law faculties in Turkey is the classical methods used in the lessons. Öztürk (2010) states that the primary purpose of the faculties is to transfer the legal information personally to the students. Despite the fact that the curriculum is very loaded, the duration of the curriculum is not sufficient and an education system based on memorization is carried out (Karayalçın, 2008). Şimşek (2010) points out that students should be introduced to different disciplines beyond the closed methods of education and

therefore current methods should be used in legal education order to solve the problems in this context.

Departing from the basic problem that law school students cannot convert the theoretical knowledge into application, questions such as *"Is it possible to create an alternative learning environment for legal education?"* and "*How to take advantage of educational technology in this process?"* come to mind. Considering the idea that virtual reality technologies can be used to create something if the truth is real (Kayabaşı, 2005), the development of a virtual court that reflects the structure and functioning of the courts in Turkey seems worth investigating. The fact that the lawyers who are trained in law faculties and the lawyers who have just started their profession cannot experience the hearing experience at the desired place, time and frequency under the current conditions can be evaluated as factors that increase the potential of educational purpose of the virtual courtroom to be developed. Yenipınar (2013) states that lawyers must be able to get over the unexpected situations that arise during the proceedings so that they can manage the court process well. A virtual court that will allow the trial experience by assuming of different roles, such as attorneys, judges and prosecutors, may be useful for law school students and inexperienced lawyers in this process. The fact that virtual courts have been developed in different countries of the world (Barnett & McKeown, 2012; Sanson, İreland, & Rogers, 2009; Ulicki, 2012) and the prospect that the trend in this direction will continue to increase (Rogers, 2016) makes it necessary to carry out interdisciplinary studies about the use of virtual learning environments in legal education in Turkey in order to keep up with the times. For using the virtual learning environments in legal education and presenting its results, it is necessary to design and develop these environments first. Thus, present study was planned to develop a three-dimensional virtual court to be used in the context of legal education. The questions to be answered in the research are as follows:

1. How can the actual court's function be transferred to the virtual environment?
2. What should a three-dimensional court be like?

Method

In this research, Design Based Research (DBR) method, which is shown as a suitable method for technology-supported or technology-based education applications, was used. DBR is a method that requires systematic, functional and product development that allows mutual

cooperation between researchers and practitioners. Focusing on the design process and the examination of the innovations designed, DBR is composed of the stages such as analysis, design/development, implementation and evaluation. The results obtained by evaluating the data obtained at each step are used for the improvement of the design pavement (Enkenberg, 2001; Wang & Hannafin, 2005). The activities carried out and the data collection tools used in this research process, which was intended to develop a virtual courtroom for use in legal education, are shown in Figure 1.

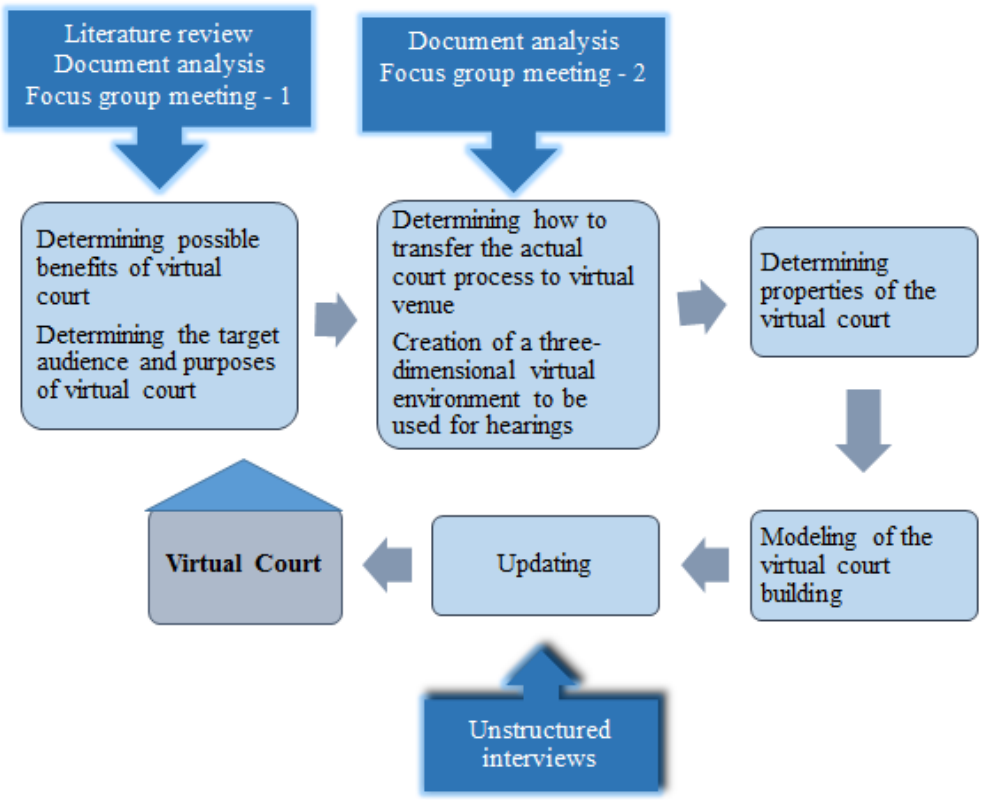

*Figure 1.*Activities carried out during research process

In the first stage of the research, review of literature was conducted and the usability of the three-dimensional virtual environments in legal education was revealed. In addition, a document review was made on the duties of judicial institutions in Turkey, the structure of the courtrooms, the types of courts and who should be present in these courts. The obtained data were used to plan the focus group meetings and to support the findings revealed by these meetings. In the first focus group meeting, discussions were made about the necessity of the virtual court, target audience and usage purposes. The second focus group meeting was devoted to how to transfer the functioning and physical characteristics of real courts to the

virtual atmosphere. The activities conducted up to this stage made it possible to determine the qualifications of the virtual court. At the next stage, a three-dimensional virtual court building, where the hearings can be held, was modelled. The opinions of the experienced lawyers on the developed virtual court building were taken and necessary updates were made accordingly. Finally, interviews with legal practitioners were made to obtain their views regarding the virtual output, and the findings were used to update the virtual court. Consequently, the virtual court was given its final shape.

Participants

The participants consist of 4 lawyers, 6 legal practitioners and 5 researchers. The expertise areas of the research team and their role in the research process are given in Table 1.

Table 1

Information about Researchers

Researcher / Title	Study Area	Role in Research
Researcher 1 Assist. Prof. Dr. (CEIT)*	Distance education Multimedia design	-Coordinating team work -Technical advice in design and development of virtual court -Data collection, analysis and interpretation
Researcher 2 Prof. Dr. (CEIT)*	Distance education Multimedia design Augmented reality	-Technical advice in design and development of virtual court -Data interpretation
Researcher 3 Assoc. Prof. Dr. (Law)	Commercial law Intellectual property	-Legal advice in design and development of virtual court -Data interpretation
Researcher 4 Expert (Distance Education Centre)	Distance education Augmented reality Virtual worlds	-Design and development of virtual court
Researcher 5 Master Student (CEIT)*	Multimedia design Virtual worlds	-Design and development of virtual court -Data collection and analysis

*Computer Education and Instructional Technologies

As shown in Table 1, the research team includes multiple researchers specialized in multimedia design, augmented reality and distance education. There is a specialist in the field of law. The judicial decisions were based on the data obtained from the lawyer and legal

practitioners in the design team on the initiative of this researcher. The lawyers are registered with the Trabzon Bar Association and each has at least ten years of professional experience. One of them is the president of the bar, and one of them is the chief of the internship commission. All of the legal practitioners are continuing their internship training in the same bar.

Data Collection and Analysis

Data collection was completed with document review, focus group interviews, and an unstructured interview. The fact that different data collection methods are used has a positive effect on the reliability of the obtained data (Streubert & Carpenter, 2011). At least two researchers served in each of the processes of collecting, analyzing and interpreting data in order to avoid prejudicial disputes arising from researchers.

Document examination requires access to written and printed documents and examining of the obtained data in a certain discipline (Yıldırım & Şimşek, 2006). In this research, academic publications about the legal system in Turkey, the structure and functioning of the courts, the contents of the corporate web sites in the field of law and video records of real courts were examined. The obtained data were first presented to the legal counsel of the research team then to the three lawyers whose professional experience was over five years for the examination. In this way, verified information was obtained and used for the purpose of establishing questions about group meetings. About technical suitability of these questions, a specialist in computer education and instructional technology (CEIT) was consulted, and views of a lawyer with fifteen years of experience was seen about legal suitability of the same questions.

Within the scope of the study, two separate focus group meetings were attended by 4 lawyers, 6 legal practitioners and research team. At the first focus group meeting, discussions were held on the subjects of how the virtual court would be developed and for what purposes it could serve. At the second focus group meeting, discussions were held on what should be done to ensure that the virtual court can mirror the actual court structure and functioning. At both meetings, all of the people in the design team were involved in the interactive decision-making process. At meetings, care was taken to create a friendly chat environment. This seems to be important in terms of finding correct and complete answers

to the questions (Streubert & Carpenter, 2011). Figure 2 contains images of the second focus group meeting.

Figure 2. Images from the second focus group meeting of the design team

Voice recordings were taken at both meetings and notes were kept during the meeting by a researcher. Voice recordings and notes were evaluated together by two different researchers and content analyzes were conducted after interviews were transcribed. The obtained data were compared with each other and their accuracy was checked. In addition, the data obtained after the meetings of both focus groups were summarized and shared with attorneys attending the meeting, and opinions were taken on whether the information was correct or not. In this way, necessary additions and removals were made to give the final shape to the findings.

At the last stage of the research, unstructured talks were held with three lawyers and three legal practitioners outside the design team concerned with the reflection of the reality of the developed virtual court. The data obtained from the interviews made by the voice recording was transcribed and analyzed by the researcher using a word processor program. Verification was achieved by comparing the data against each other.

Results

In this section, the results are presented under two headings in relation to the research questions.

Results related to transferability of real courts to virtual media

At the first focus group meeting, a presentation was made by the research team on the educational purposes of virtual worlds and virtual worlds. Then, the following questions were posed to the group by the researcher in charge of the meeting: *"Do you think the virtual court would contribute to legal training?", "Who should virtual court be developed for?", "For what purposes can virtual court be used?", "Should virtual court reflect exactly the real court process?"* In the discussions, the accepted views on the virtual court audience and purpose were as follows:

Virtual court can be used;

- As part of teaching methods and techniques in the process of transforming theoretical knowledge into practice in law faculties,
- as a lifelong learning environment whereby experienced lawyers (lawyer, judge, prosecutor) can share their experience with younger collagues and legal students,
- for training of legal practitioners,
- and as a chatting forum where lawyers in different cities of the country can communicate and interact with each other.

All of the lawyers in the team reported favourable opinion regarding the transferability of real courts to virtual courts. It was stated that the virtual court must reflect the functioning of the actual courts in every aspect and courtrooms must be equivalent to real ones. It was added that a legal person would benefit from experiencing the position of a prosecutor, judge, lawyer, or even a clerk in a virtual court. It is also thought that the education to be given in the virtual court will allow the use of different teaching methods and techniques, can provide a flexible and independent learning environment and can help correct procedural mistakes made in the legal system. During the meeting, one of the most frequent questions asked by legal practitioners to the research was how to use virtual worlds. One of the practitioners said: *"I downloaded the SL from the internet logged in. Suppose that we made the virtual court. All trainees got membership and got connected. How are we going to the virtual court?"*

In the second focus group meeting, following questions were addressed to guide the group: *"What is the functioning of the judicial system like in Turkey?","How is a lawsuit started,*

how is it continued and ended?","What is the structure of courtrooms like?","Are there different types of courtrooms?","What officials are in the room?","Who should speak when in the courtroom?","Can anyone enter hearings?" After the details were set out regarding details of the structure and functioning of the legal system in Turkey, debate was held during the rest of the meeting on how to transfer the actual court to virtual venues. In this context, the following findings were obtained:

- In the first instance, the virtual court should be developed to cover one or two court cases, it should be opened to use and the scope of the virtual court should be expanded in the direction of the findings.
- The clerk position in the virtual court should not be neglected and they should be able to keep records as in the actual courts. Otherwise, there will be a serious shortage of legal education and procedural mistakes
- Avatars must be able to be used with the body language (hand and arm movements and mimics) to compromise and to ensure the interactions between the parties in the new legal system. Opinion of one of the lawyers about the matter was as follows: *"Sound tone and mimics are important when deciding in real courts, and the same must be true in the virtual environment"*. Another lawyer said *"It is important how to ensure compromise and reconciliation in the virtual environment"*.
- In the virtual court, the process of requesting documents from other institutions should be operated. One of the lawyers said *"The documents to be investigated remain in the prosecutor's office. There are 8-10 prosecution types. For example, IT prosecution is interested in IT crimes. If the prosecutor needs the testimony of the person, he will write to the police or gendarmerie station and ask for it. If it is required to demand a document from the university or criminal justice department, a letter is written the document is requested from that institution. All this needs to be moved to virtual venue."*
- Information and document safety should be able to be maintained in the virtual court.
- The files must be stored according to the year and number basis as in reality.
- The postponement process of the cases should be designed to reflect the reality.

When both focus group meetings and the data from the document analysis were evaluated together, the following findings were obtained regarding the qualities that should be relevant to the design and use of the virtual court:

- The virtual court should include two hearing rooms, one of which is for civil law and the other for heavy criminal, as well as the units that are needed in the process of the operation of these courts.
- The virtual court should have basic roles of judges, prosecutors, lawyers, clerks, bailiffs, witnesses and defendants avatars. The user must be able to participate in the process by choosing from within these roles. It should also be possible to participate in the role of audience in order to facilitate the use of the virtual court in educational activities.
- The entrance to the virtual court must be encrypted. File and document access for avatars should be organized according to roles (judge, prosecutor, lawyer).
- The avatar in the clerk's role must use the writing tools in the virtual world where the virtual court will be integrated to keep records. Besides this, the interviews should be archived by video recording.
- A database should be created to hold the trial files by year and number basis and be included in the virtual court.
- The authority to postpone cases should belong to the avatars in the role of judge. This postponement can be done in a different day, as it really is, or after a much shorter period of time.

Results from the Virtual Court

A three-dimensional virtual court was planned in the direction of discoveries about how physical properties of real courts can be transferred to virtual ones. There are two hearing rooms on the first floor of the building. One of these halls is law school, the other is a heavy criminal courtroom. A large number of chairs were placed in corridors along trial halls, and this section was converted into a waiting room. In addition, there are three units (rooms) to be used for different purposes. One of them is an upper rank office downstairs for judges and prosecutors. The other two rooms upstairs are the clerks' offices where correspondence is carried out.

The drawn plans were presented for the examination of the lawyers in the design team and the opinions were taken through unstructured interviews. Lawyers stated that separate rooms should be allocated for judges and the prosecutors, and that there should be one archive room in the building. Moreover, it was suggested that the exterior of the building be similar to the Trabzon Bar Association. In this context, three rooms were added to the upper part of the hearing rooms with high ceilings, creating an archive room with two separate rooms for judges and prosecutors. In this way, the plan of the virtual court building was finalized by updating and the drawings were transferred to the computer environment. Figure 3 shows the plans for the courtrooms.

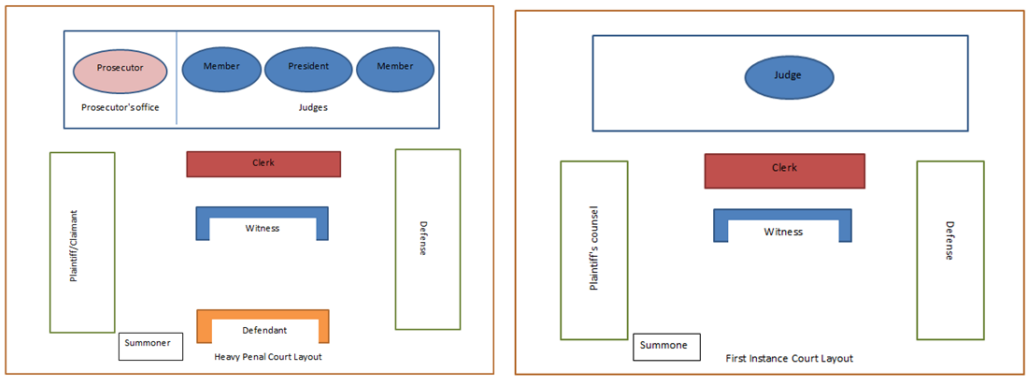

Figure 3. Layouts of the rooms in the court

Three-dimensional modelling of the virtual court building was done using SketchUp and 3D Max programs. Figure 4 shows the screen images of the works performed by these programs during the modelling process.

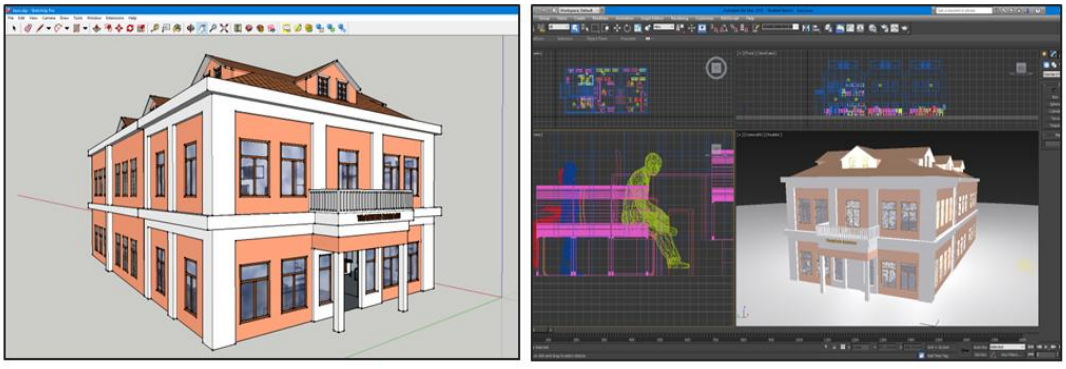

Figure 4. Activities carried out in the process of modelling of virtual courthouse

In the process of modelling the virtual court, initially, the external and internal elements of the building were created using the SketchUp program according to the outlays. Texturing processes were then performed on these documents transferred to 3D Max program.

Unstructured negotiations were held with three lawyers outside the design group to find out if the three-dimensional virtual court building covers the sections and units needed in the judicial process, and how relevant they are. In the light of the suggestions, some amendments were made on the building. These amendments focus on the settlement of the objects in the courtrooms, the size of the units in the building and on which floor each unit should be. At the next stage, the virtual court building was presented for the examination of three legal practitioners who were not in the design team, and the views were taken through unstructured interviews. The legal practitioners did not bring any criticism or recommendation that would require a change in the virtual court. The external appearance of the developed virtual court was created by analogy to the Trabzon Bar, as seen in Figure 5.

*Figure 5.*Virtual court and appearance of Trabzon Bar Association

Various images belonging to the virtual court building are given in Figure 6.

Figure 6. Images of the inside of the virtual courthouse

When the data obtained in the course of the design improvement are evaluated as a whole, in order to avoid technical problems in the use of the virtual court and to increase the educational efficiency, the following conditions should be taken into consideration:

- The virtual court will work smoothly when transferred to the virtual world of SL. Interaction can be carried to the upper levels thanks to the written and verbal communication tools provided by SL virtual world.
- One technical expert must be in charge to perform the tasks such as creating case files, adding to the system, updating them, recording hearings, or helping users in these matters.
- The participants are responsible for their appropriate behaviours in the courtroom. The dynamic nature of SL provides a significant advantage in this respect. For example, an avatar in the prosecutor role will be alerted by the judge when he wears the avatars of the judge. Similarly, an avatar will be warned if it takes a seat that does not belong to its own role.
- The flexibility of the SL environment, the ability to move in and out when requested, and the ability to resume where it is needed, will be a great convenience for practitioners in situations such as delays in actual courts, supply of missing documents, or breaks in hearings.
- The ability to run pre-recorded audio and video files in SL virtual world and presentation on slides facilitates sharing of information and documents in the jurisdiction process.
- In order to solve technical problems originating from SL virtual world or troubles due to unfamiliar users, training videos about the use of SL should be placed in the virtual courtroom. In addition, participants' computer literacy levels and internet use skills should be determined and training should be arranged for the SL and virtual court use if necessary.

Discussion and Conclusion

The fact that a large number of studies on different disciplines related to three-dimensional learning environments have been made and the positive results obtained from these studies show that three-dimensional virtual learning environments can be developed in order to

reduce or eliminate existing problems related to basic legal education and professional development in Turkey. As a matter of fact, studies are available which suggest that virtual learning environment has positive effects on the professional development of students and facilitate the transformation of theoretical knowledge into practice in legal education.

In a study by Sanson, et al., (2009), a virtual environment was designed in which law faculty students could conduct negotiations and interviews, and applications were made with the participation of volunteer students. The results of the research revealed that the virtual world offers an independent learning environment in which law school students can use for the development of professional skills, and offers great advantages compared to face-to-face education. According to the results of a survey in Australia on virtual learning environments used in legal education (Yule, McNamara, & Thomas, 2009), it was shown that technologies such as video conferencing and the virtual world can be used to improve the debate skills of law students and gain professional experience. Barnett and McKeown (2012) developed a courtroom in the virtual world for the use of students as part of the 'Criminal Law' course within the Southern Queensland University. As a result of the research, it seems that the virtual court has succeeded in the process of transforming the theoretical knowledge of law students into practice.

One of the best examples of the use of virtual worlds in legal education is the Democracy Island, founded by the New York Law School. A Supreme Court building and miniature models of urban neighbourhoods were constructed on this island in the SL virtual world. There are also simulations in the system where written and verbal communication tools and web conferences are used effectively. Students have the opportunity to learn the legal process in many ways, such as acquaintance with the managers, acquiring by sales, renting, building and using the property through the role of the students (Ulicki, 2012). Since the functioning on this land is in compliance with the American legal system, it may not be able to provide the necessary level of benefit for Turkish law students and lawyers to translate theoretical knowledge into practice. Besides, in order to be effective, participants need to be above a certain level of English speaking and understanding skills. Therefore, the virtual court developed in this study carries unique value for holding meetings in accordance with the Turkish legal system.

In a study on the views of legal students participating in a virtual court created in the virtual world SL (Ireland, Sanson, & Rogers, 2010), attention is drawn to the fact that students are much more concentrated in conversation than in real life. The virtual court developed in this study will provide opportunity for participants to experience trial experience at any time and at any desired time. In connection with this, participants may be part of an active learning environment in a legal context where they need to use the legal language.

Virtual worlds have tools to enrich communication and interaction between avatars. General and personal correspondences can be made with the text-based communication tools in SL virtual world; voice communication tools can be used to chat with other avatars, and various mimics and animations such as laughing, shouting and hand waving can be used. Beside these, the mimics needed can be designed and uploaded to SL (Dinçer, 2008). When the virtual court is transferred into SL and implemented, mimics and animations related to the human reactions in real courts can be programmed and used by avatars.

Law faculty students will be able to participate in the out-of-school meeting via internet from the place they want outside the school, which will save time and cost. This result seems to be supported by the study carried out by Ireland, et al., (2010). It becomes important that students who participated in the virtual court application created in the virtual world of SL have to experience a trial without having to travel within the positive opinions of the process. In the same study, it is emphasized that students should be able to participate in distance and international hearings. In the fall of 2006, a course called 'CyberOne: Law in the Court of Public Opinion' was opened by the Harvard University Law School. Students access the materials, the videos related to the lesson and the fictional courtroom through the media designed for them in the virtual world. Students who complete the course in which instructors and students are represented by avatars are entitled to receive credit. This course is organized not only for Harvard students, but also for accessibility of computer users around the world (Lamb, 2006).

The tendency towards the movement of education to the digital medium in developed countries of the world also manifests itself in the field of law. Rogers (2016) notes that in many countries of the world, there are virtual courts and the number of them will increase; anticipates that fictional trial contests will be held in the virtual world of SL in the future. Although the use of three-dimensional virtual learning environments for legal

education in Turkey has not been widespread, the use of electronic media in the legal system is increasingly available. The Turkish Bar Association and bar associations affiliated to this association actively use the web sites and carry out informative and announcement works in this way. In the scope of The National Judicial Network Project (UYAP, http://www.uyap.gov.tr/), legal employees can improve themselves and be aware of developments by means of the e-tracking module and SMS system. The study by Kılıç (2009) shows that lawyers believe in the benefits of vocational education through electronic learning environments. Therefore, it is considered that the virtual court will contribute to the spread of the use of virtual learning environments in legal education by going beyond the teaching methods and techniques in Turkey.

As a result of this study; it could be suggested that the court rooms of the actual courts and the related judicial units can be physically transferred to the virtual medium, and the functioning can be made close to reality by removing some of the limitations. In order for the roles of the virtual court to be constructed in such a way as to overlap the reality, the media must be integrated into a virtual world and the means of interaction must be made available. For archiving and recording, databases should be created and integrated into the system using connection items. The virtual court can serve as a part of lifelong learning in legal education as well as in the context of pre-service and in-service professional development activities.

Recommendations

The developed virtual court can be used by transferring it to the virtual world environment. In this process, the designated virtual court qualities will guide the process. Research can be done on the effectiveness of the virtual court in legal education. Other working groups may be composed of law school students, legal practitioners, law faculty members and experienced lawyers separately or together. Further research on issues such as the virtual court's contribution to interaction among users, usability with different teaching methods and techniques; and evaluation of it from attorneys, teaching staff and students' points of view, and results can be discussed.

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Research Article

Pre-service Mathematics Teachers' Opinions about FATİH Project and Technology Use in Mathematics Education[1]

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Abstract

FATİH Project is one of the most extensive movements on the way of integrating technology into schools. One crucial factor for FATİH Project to be successful is teachers who are the first degree practitioners of the Project. At this point, pre-service teachers who are the near future's teachers need to know the requirements of the Project. Therefore, the necessity of providing trainings intending FATİH Project during undergraduate education is heated-debate to discuss. Another point under discussion is to provide domain specific (mathematics domain in this study) training for teachers. With this respect, the purpose of this study was to investigate pre-service mathematics teachers' opinions about technology use and FATİH Project before and after given preparatory training towards it. The participants of this study with qualitative paradigm were composed of 15 pre-service elementary school mathematics teachers who were enrolled in the fourth grade in a public university. FATİH Project preparatory training was prepared according to the in-service training provided by Ministry of National Education for teachers and was designed in line with mathematics lessons specifically. This training lasted

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10 weeks with practical applications. An open-ended opinion questionnaire was subjected to pre-service teachers before and after the training. In addition, each participant was interviewed. The findings gathered before and after training were compared. According to the results of the study, it was observed that the definitions of pre-service teachers for FATİH Project were deepened and they used concepts specific to mathematics lesson. In addition, they reported opinions about the positive, negative aspects of and applicability for the Project. Lastly, it was observed that pre-service teachers' awareness towards technologies such as software, hardware and educational portals that were used specifically to mathematics increased in mathematics lessons.

Keywords: *FATİH Project, pre-service mathematics teachers, technology, interactive whiteboards.*

Introduction

Technology makes itself felt in everywhere in daily life. Particularly, since technology brings various facilities to human lives, many individuals encounter it at home and work and they try to use such technology (Daşdemir, Cengiz, Uzoğlu, & Bozdoğan, 2012). Considering the facilities that technology brought for human life, it is inevitable to use technology in education (Aydın, 2005). Using technology in education has various benefits such as facilitating learning, diminishing the learning period and reducing the teaching costs (Akkoyunlu, 1998; Daşdemir, et al., 2012). Therefore, technological development movements are always tried to be observed in order to make the education more effective (Demir & Bozkurt, 2011; Ersoy, 2005).

In our country, a project called FATİH Project which can be translated as an acronym for *Fırsatları Arttırma ve Teknolojiyi İyileştirme Project* [movements to enhance opportunities and improve technology] has been initiated to use technology actively in education. With this project, touch-sense interactive whiteboards were established in the classrooms, interactive whiteboards were connected to internet network, and tablet computers were distributed to students and teachers. In addition, establishment of Education Information Network (Eğitim Bilişim Ağı-EBA) in order to provide and share educational contents that contribute to the effective use of these technological equipments was one of the sub-stages of continuing project (Yıldız, Sarıtepeci, & Seferoğlu, 2013). Examples of similar projects were also initiated in international base. Some of international projects, for example, were Project of Preparing Tomorrow's Teachers to Use Technology initiated in USA (Whittier & Lara, 2006) and Smart Education in Korea-Digital Textbook Initiative Program initiated in South Korea (Seo, 2012). Moreover, an organization called One Laptop Per Child supplied very cheap computers and tablet-computers and distributed to children living in underdeveloped countries in order to familiarize them with technology. Therefore, this organization aimed at providing better education for these children. In line with this aim, it distributed more than 2.5 million computers and tablet-computers to children in underdeveloped countries (Warschauer & Ames, 2010). As it can be seen from these examples, the use of technology in education for some countries takes important place in order to raise the level of education to higher levels and they make more efforts for integration of technology in education.

Considering the resources related to the use of technology in mathematics education, it is generally used while presenting during lecture, while dealing with some mathematical calculations and while preparing mathematical materials (Kayaduman, Sırakaya, & Seferoğlu, 2011; Moreno-Armella, Hegedus, & Kaput, 2008; Tatar, 2013). Presentation based use was characterized as its incomplete and out of purpose use or inadequate use of technology (Kayaduman et al., 2011). Its use for mathematical

calculations is intended to facilitate complex operations. It can be likened to an engineer receiving support for mathematical operations from a computer (Moreno-Armella, Hegedus, & Kaput, 2008). Lastly, its use as preparing mathematical materials involves the other uses inside, because it may be easy to make presentation during mathematical activities and it might usual to make calculations during mathematics activities. Beyond that, on the other hand, technology as an educational material can be used for listing and analyzing the data (Baki, 2008; Iranzo & Fortuny, 2011), for making 2D and 3D visualizations (Tatar, 2013), for making drawings permitting changes by dragging the elements in it instead of using static ones (Kabaca & Tarhan, 2013; Özen & Yavuzsoy-Köse, 2013) and for getting support from simulations (Polly, 2014).

In the literature, there were various studies on using technology in classrooms (e.g, Baki, 2008; Kayaduman et al., 2011; Zengin, Kağızmanlı, Tatar, & İşleyen, 2012). In addition, some studies in the literature focused on teachers' and students' perceptions about technology and technology use in mathematics education (Aktaş, Gökoğlu, Turgut, & Karal, 2014; Gürol, Donmuş, & Arslan, 2012; Pamuk, Ergun, Çakır, Yılmaz, & Ayas, 2013) and investigated change in teachers' attitudes and beliefs towards technology after they were provided with in-service training related to technology use (e.g., Ertmen, 2005; Kabaca & Tarhan, 2013; Usta & Korkmaz, 2010).

Although Aktaş et al. (2014) indicated that teachers' awareness about educational technologies is high, Gürol, Donmuş and Arslan (2012) stated that teachers might experience difficulties in using such technologies. In addition, they emphasized the necessity of providing in-service trainings related to the use of technology, which should be carried out in long term, based on practice, in small groups and should be domain specific. In similar study, the necessity of technology integration in classrooms with school-university cooperation was emphasized (Eren & Yurtseven-Avcı, 2016). In their study related to FATİH Project, Pamuk et al. (2013) found that teachers and students were prone to use interactive boards. According to the findings of this study, however, teachers had the thought that the tablet-computers were not an effective tool for learning. Moreover, Pamuk et al. (2013) indicated that technological problems and teachers' lack of pedagogical and professional skills related to the use of technology restricted teachers from using readily available technological possibilities. The lack of appropriate contents is also one of the results of the study by Pamuk et al. (2013), which limits the use of technology in classrooms. Similarly, Kayaduman et al. (2011) who studied on FATİH Project pointed out that teachers have deficiencies and negative attitudes about computer literacy and emphasized that these deficiencies should be addressed through various in-service trainings. In another study related to FATİH Project, Banoğlu, Madenoğlu, Uysal, and Dede (2014) found that teachers mostly preferred to use the interactive boards and they were in different levels of capabilities for content selection and development. Moreover, they discussed about the necessity that, firstly, teachers should be ready and willingly to learn in order to ensure that the training given in line with the project is successful for them.

Similar to the studies conducted in Turkey, Wachira and Keengwe (2011) indicated that teachers were lack of knowledge about technology and instead of old habits of using technology, they created fear and anxiety against innovation in educational technologies. Therefore, Wachira and Keengwe (2011) emphasized the necessity of taking teachers' old habits and anxieties into account while providing them with technology related in-service trainings. Similarly, Ertmen (2005) stated that it is necessary for technology integration of the lessons to change teachers' beliefs about using technology by providing them trainings on how to facilitate their teaching activities.

It is important to consider prospective teachers', who are our future teachers, opinions about the technology and the use of educational technology in classroom environment. In the near future, the prospective teachers would be the practitioners of educational technologies in classrooms, therefore, the importance of the studies conducted with them becomes obvious. With this respect, findings of the study conducted by Kayaduman et al. (2011) with teachers were parallel to the that of study conducted by Usta and Korkmaz (2010) who indicated that increasing pre-service teachers' levels of technology literacy influences their attitudes positively towards their use of technology in education. Similarly, in Topal and Akgün's (2015) study investigating pre-service teachers' use of internet for educational purpose, it was stated that pre-service teachers' qualifications of using FATİH Project technologies and finding resources for educational purpose from internet and their experiences in doing so were directly related. In this context, their self-efficacy perceptions have also improved. As recommendation, they stated that trainings aiming to develop these perceptions should be provided (Topal & Akgün, 2015). Considering that FATİH Project is a crucial educational reform for Turkey, it was known that pre-service teachers were not sufficiently tracking these reforms and the developments regarding their professional areas and that they were only interested in hearsay information about these issues (Duman, Kural-Baykan, Köroğlu, Yılmaz, & Erdoğan, 2014). Technologies and software specific to mathematics education are among them. When the mathematics education was taken into consideration, there was no study about FATİH Project particularly conducted to pre-service mathematics teachers.

Significance and Purpose of the Study

One of the activities in order to reach for the success of FATİH Project is to provide teachers with in-service trainings based on the purpose of FATİH Project (Banoğlu et al., 2014). Considering the gains of necessary knowledge and skills for teachers to apply effectively the opportunities of FATİH Project (Yıldız, Sarıtepeci, & Seferoğlu, 2013), it is obligatory for teachers to receive such trainings. When the courses that the pre-service teachers took during their university education are examined, two courses including the basic computer course for computer use and the course of instructional technology and material design are aim at preparing pre-service teachers for the use of educational technologies (Council of Higher Education [YÖK], 2007). Related to technology use, in addition, pre-service

teachers are taught about some software in selective courses. However, there is no course or content covering the contents of how to use interactive boards and tablet-computers distributed, of how to integrate Antropi or different applications previously uploaded into these technologies in the lessons, of how to benefit from EBA or different portals, of how to reach readily available content related to lessons taught, and of how to use e-books effectively with students in the lessons for the sake of FATİH Project in educational curricula of faculty of education for preparing pre-service teachers. Considering the necessity of pre-service teachers' awareness about FATİH Project, the purpose of this study was to reveal the pre-service teachers', who received preparatory training for FATİH Project, technology use and opinions about FATİH Project before and after the training given. With this respect, the sub-research problems were as follows.

1- How do pre-service mathematics teachers define FATİH Project before and after preparatory training given for FATİH Project?
2- What are pre-service mathematics teachers' opinions about FATİH Project before and after preparatory training given for FATİH Project?
3- What are pre-service mathematics teachers' opinions regarding the use of technology in mathematics education in context of FATİH Project before and after the preparatory training given for FATİH Project?

Methodology

In this section, the research design was presented in line with the purpose of the study and research problems. In addition, the information about participants, data collection tools, the training given, data collection procedure and the analysis of the data gathered.

Research Design

This is a qualitative study due to its aims of in-depth investigation of the group studied with the data obtained by different data collection tools and of explaining and presenting the findings obtained in this direction (Creswell, 2007). In this study, pre-service teachers' opinions about FATİH Project and the use of technology in mathematics education were obtained from semi-structured interviews, opinion survey involving open ended questions and field notes during the preparatory training.

Participants

The participants of this study were composed of 15 pre-service teachers who were enrolled in the department of Elementary School Mathematics Education in a public university located in the East Anatolia Region of Turkey. Participants were required to have full participation during the 10-week preparatory training. In this context, volunteer participants were selected for the study. Therefore, convenience sampling method was used in the participant selection process (Yıldırım & Şimşek, 2006). There were 15 pre-service teachers, six of whom were male and nine of whom were female. All the participants were selected from senior pre-service teachers who completed theoretical courses on the teaching profession and were attending courses such as practical school experience and teaching practice courses. Pre-service teachers were coded as PT1, PT2, …, PT15.

Data Collection Tools

In this study, semi-structured interviews, opinion survey involving open-ended questions and field notes during preparatory training were used as data collection tools. The semi-structured interview form and open-ended opinion survey were carefully designed to show parallelism with and were developed by researchers by using the related studies in the literature. These data collection tools were examined by two experts, one of whom was in instructional technologies and the latter of whom was in mathematics education. Therefore, the content validity was tried to be ensured. In addition, three pre-service who were not the participants of this study were interviewed. The final version of this data collection tool was prepared after the pilot study. In addition, field notes gathered during the preparatory training were also used to support the data obtained from other data collection tools.

Application of Preparatory Training and Data Collection Procedure

After the completion of preparing data collection tools, 15 pre-service teachers were subjected to opinion survey involving open ended questions. In addition, semi-structured interviews were performed with each pre-service teacher as pre-interviews and the voice records were gathered in accordance with the participants' permissions. Then, the process of 10-week preparatory training for FATİH Project began. In addition to the mandatory courses to which the pre-service teachers were required to attend, this training was completed in 40 hours in total (four hours per week). The work calendar and the content of this training was presented as follows.

Table 1

The Work Calendar and the Content of the Preparatory Training

Weeks	Content
1st Week	General Introduction for FATİH Project and the preparatory training
2nd Week	Safe use of information technologies
3rd Week	The use of interactive whiteboard
4th Week	Reaching lesson contents in the context of FATİH Project – Education Information Network and external sources [Eğitim Bilişim Ağı] (EBA)
5th Week	Reaching lesson contents in the context of FATİH Project – Education Information Network and external sources [Eğitim Bilişim Ağı] (EBA)
6th Week	Preparing content and additional applications on mathematics teaching – with dynamic geometry software
7th Week	Preparing content and additional applications on mathematics teaching – with dynamic geometry software
8th Week	Preparing content and additional applications on mathematics teaching – Word, Excel, Power-point
9th Week	Preparing content and additional applications on mathematics teaching – Online tools (Wolfram Alpha etc…), creating and organizing video-picture
10th Week	The use of tablet computers and e-books (enriched book) in teaching mathematics

While the content of this training was being prepared, the content of the preparatory training for FATİH Project given to the teachers by Ministry of National Education was taken into consideration. However, this training does not provide any branch specific content for teachers, because it was given to the teachers from different branches of a school together. In this context, this training, which was specific for teaching mathematics, was particularly prepared for pre-service mathematics teachers and, therefore, its content included the software and tools that can be used in teaching mathematics. First of all, the lessons began with the knowledge of how to use information technologies safely. In the third week, the properties of interactive board and how to use applications such as Antropi, which was already uploaded and continuously used by teachers, were presented with practical applications. In the fourth and fifth weeks, information about EBA and external sources for reaching mathematical contents that could be used in lessons were given and applications related to these issues were done. In the weeks from sixth to ninth, trainings for developing content for mathematics education were provided starting

with Geogebra, a special dynamic geometry software for mathematics. Pre-service teachers took an elective course regarding how to use this software in the semester before the semester that this training was provided. In this training, however, they did applications about preparing contents and how to reach readily available contents. How to make a model for a given mathematical problem was presented. For example, an application was done by means of Geogebra which checks whether the number entered in the input field is prime number and lists its positive divisors if it is not prime number. In addition, the benefits of Geogebra such as its computer algebra system, geometry, three dimensional graphing screens, spreadsheet property and the relation among different representations in mathematics were presented to pre-service teachers in the lessons. Moreover, how to use the readily available contents from the Materials section of Geogebra's internet site was instructed. Then, how to benefit from programs in Office software was shown. Information about the equations and symbols parts of Word and MathType that can be embedded into Word as additional application was mentioned. In addition, how to use the properties of Word program including table, equation, symbol, graphics and so on to prepare materials for lessons was shown. It was presented that the Excel could be used for algebra applications and PowerPoint could be used to visualize two and three dimensional drawings. In the ninth week of the training, they were informed about the online mathematics applications such as WolframAlpha software. In addition, pre-service teachers were informed about how to merge videos and pictures related to mathematics in order to prepare mathematical content. They were also informed about who to present the new material as an effective material to students in the lessons. In the last week of the training, how to use e-books found in FATİH Project's tablet-computers distributed and in interactive board was presented.

This preparatory training was carried out in the university's computer labs. Lastly, each pre-service teacher was expected to apply two activities in classroom environments in the schools that they go for the requirements of school practice course. With these activities, it was expected from pre-service teachers to observe the situations when they encounter with real-classroom environment in line with FATİH Project. Therefore, pre-service teachers had opportunities to practice in line with the training provided.

During the training, both researchers were present. While a researcher was presenting the content of the training, the other researcher took the field notes and helped participants for the applications and questions asked.

After the training ended, the participants were again subjected to the open-ended questionnaire. In addition, semi-structured interviews were performed with each one as post-interview. During the interviews, both researchers were present and participants' permissions were gathered for voice-record. The interviews lasted between 20 and 32 minutes with an average of approximately 26 minutes.

Data Analysis

The data were gathered via the qualitative data collection tools. In the data analysis, content analysis method was used. The preliminary and post surveys and preliminary and post interviews were analyzed together. In this context, the categories and main themes were formed by arranging the codes that emerged in the analysis of the data. As a result of the organization of the categories and themes, the processes of reporting the data and its interpretation have begun. Therefore, the Corbin and Strauss' (2007) suggestions were taken into consideration. Corbin and Strauss (2007) indicates that the qualitative data obtained from interview forms or interviews are tried to be combined under the general themes according to their characteristics. While doing so, the codes gathered from qualitative data are evaluated and the categories are created. The related codes are reported under the general themes previously determined. In this study, the main themes were determined as the pre-service teachers' definition of FATİH Project, their opinions about FATİH Project, and their opinions about the technology use in mathematics education. In order to present the data in enriched way, frequency and percentage tables were used.

The data gathered from the interviews, opinion surveys and field notes were triangulated in order to ensure internal validity. For external validity, there were direct quotations from participants' responses to the survey and interviews during presenting the data. The data gathered from data collection tools were analyzed by both researchers separately and the inter-coder agreement was sought at the end (Miles & Huberman, 1994). Agreement percentages for main themes were 75%, 83%, and 86%.

Findings

The data gathered before and after pre-service mathematics teachers were provided with preparatory training for FATİH Project were presented under three main parts. These themes were how pre-service mathematics teachers define the FATİH Project, their opinions about the project and their opinions about the technology use in mathematics education.

Pre-Service Mathematics Teachers' Definitions for FATİH Project

Pre-service mathematics teachers were expected to define FATİH Project in the interviews and open-ended survey. As a result of data analysis, it was observed that they made superficial definition before the preparatory training provided for FATİH Project. Their definitions were skewed towards its

objectives. Five pre-service teachers' definitions before and after the training provided were presented in the Table 2.

Table 2

Pre-Service Mathematics Teachers' Definitions for FATİH Project

Pre-Service Teacher	Definition before the Training	The Definition after the Training
PT7	*I don't know anything*	*The FATİH Project aims at students' active use of technology and technology structured education system in classrooms by bringing smart board and tablet-computers to all schools in Turkey.*
PT8	*FATİH Project is a system that facilitate students' studies at desired time by recording the courses instructed to students*	*The FATİH Project is a project that embodies the subjects on smart boards with visual materials and adopts a student-centered approach to the education by diversifying instructional methods and techniques*
PT10	*I know that tablet computers were distributed to students.*	*I know that the smart boards are used in classrooms with FATİH Project. I think that the written materials are loaded into smart boards with smart board applications, the materials related to the subjects which the teacher is working with are sent to the tablet-computers given to the students, this kind of interaction is provided for students to learn, and the lessons are tried to be more efficient by using technology*
PT11	*Smartboards at schools, distributing tablet-computers to children and listening to the lessons from the addresses of internet sites provided.*	*The FATİH Project is a project aimed at ensuring that students who are distributed smart boards and tablet*

Pre-Service Teacher	Definition before the Training	The Definition after the Training
		computers in all schools will better understand the lesson with technology.
PT12	*I know it provides equal opportunities for students. It aims to integrate technology into education and teaching.*	*FATİH Project is a project aiming at increasing the quality of the education by integrating the technology into education. Providing equal opportunity and increasing the functionality of education by saving time are among its aims.*

Investigating pre-service teachers' definitions, it was observed that their opinions about the project before the training were limited to a few points. As a result of the analysis of all pre-service teachers' definitions, pre-service teachers' ideas were concentrated on distribution of tablet-computers to students (f=9, 60%), use of smart (interactive) board (f=7,47%), and technology use in education (f=6, 40%). In addition, some codes such as possibility of distant education, use of smart phones were also found in pre-service teachers' definitions. It was an interesting finding that two pre-service teachers (13%) stated that they had no idea about the project.

After the training, pre-service teachers' opinions were not limited to these three points. Although almost all pre-service teachers mentioned about smart (interactive) boards, distribution of tablet-computers and technology integration, these were not superficial awareness. Instead, they used these terms in their definitions in line with objectives of FATİH Project. For example, PT7 made the definition in the direction of presenting the technology in structured form in education. In addition, it should serve the active participation of the students. On the one hand, PT10 stated in his definition that the project would contribute to teacher-student interaction and make the lessons more efficient, on the other hand, PT11's definition was about more meaningful understanding of the lessons. In addition, PT11 stated a definition covering the acronym meaning of FATİH Project. PT11's definition was involving the information about the equal opportunity. Moreover, PT8 stated in her definition that instructional methods and techniques would be diversified by means of FATİH Project.

After the training, the concepts for the definition that pre-service teachers used for FATİH Project were also diversified. Some of the concepts that pre-service teachers used in their definitions were student-

centered education, visualization, equal opportunity, computer assisted education, motivating students, reaching the knowledge easily, student-teacher interaction, saving time, and structured education.

The provided training was shaped particularly for mathematics education. In this context, this situation was observed in pre-service mathematics teachers' definitions. For example, PT8 stated that the subjects could be concrete and visual materials could be presented in the lessons. Similarly, PT2 stated that it would be easier to present visual materials in mathematics lessons. In addition, PT3 made a definition of how mathematical concepts would be presented more easily by mentioning about the visualization and opportunity of student-teacher interaction that interactive boards satisfy.

Pre-Service Teachers' Opinions about FATİH Project

Pre-service mathematics teachers' opinions were sought about FATİH Project. Their responses before and after preparatory training were investigated over a few themes. These themes were shaped according to pre-service teachers' opinions about the benefits of the projects, possible negative aspects of it, and its applicability. Table 3 presented the pre-service teachers' opinions about the benefits of the project.

Table 3.

Pre-Service Mathematics Teachers' Opinions about the Benefits of FATİH Project

Categories		Codes	Before the Training		After the Trainig	
			f	%	f	%
Related to Course Content		It provides visualization in the lesson	4*	27	7	47
		It provides relation with daily-life.	1	7	6	40
		It eases the understanding of the lessons.	1	7	5	33
		It provides concretization of the concepts	2	13	3	20
		It supports the interdisciplinary studies.	-	-	3	20
		It provides permanent learning.	-	-	1	7
Related to Process of Instruction		It saves time.	3	20	8	27
		It provides rich material possibilities (video, film, visuals, vb..)	1	7	2	13
		It increases productivity	2	13	2	13
		It reduces teachers' load.	-	-	2	13
		It supports the consolidation of the courses.	-	-	2	13
		It provides student-teacher interaction.	-	-	1	7

Categories		Codes	Before the Training		After the Trainig	
			f	%	f	%
		It supports teachers' effective teaching.	-	-	1	7
Related to	Belief/Interest	It increases students' motivation to the lessons.	-	-	4	27
		It increases students' interests to the lessons.	1	7	3	20
		It allows the lessons to be enjoyable/plausible.	2	13	3	20
		It reduces/inhibits students' prejudices to the lesson.	-	-	2	13
Miscellaneous		It provides economic learning environment.	-	-	2	13
		It provides students with equal learning environment.	-	-	1	7
		No Idea	2	13	-	-

*Each pre-service teacher may state more than one response.

Pre-service teachers' responses were summarized in different categories in Table 3. Comparing their opinions before and after the training, pre-service teachers' preliminary opinions were superficial. However, it was found that they showed more comprehensive answers after training. In general, the benefits of FATİH Project were appeared to be collected in three categories. These were related to course content, processes of instruction, and beliefs/interests. Before the training, pre-service teachers' opinions were limited to visualization of the lessons (f=4, 27%) and concretization of the concepts (f=2, 13%) when the content related category was considered. After training, on the other hand, they stated that FATİH Project helps to visualize the lessons (f=7, 47%), relate the lessons to daily-life (f=6, 40%), ease the understanding of the concepts (f=5, 33%) and concretize the concepts (f=3, 20%). In addition, they stated that it supports the interdisciplinary studies (f=3, 20%) and permanent learning (f=1, 7%) after the training. For the visualization of the lessons and concretization of the concepts, PT3 and PT9 stated the following statements before the training.

> "*The project supports learning by visualizing the lessons without losing too much time*". (Before the training, PT3, Survey questionnaire)
>
> "*With the FATİH Project, it is possible to break down the abstract rules of education, be more concrete, permanent and more enjoyable"*. (Before the training, PT9, Survey questionnaire)

For the visualization of lessons and concretization of the concepts, on the other hand, PT8 stated as follows after the training.

> "*FATİH Project is a useful application for students because it activates visual senses by providing concrete narratives*". (After training, PT8, Survey questionnaire)

For the interrelation with daily-life, PT10's statement before the training and PT15's statement after the training were as follows.

> "*I think it is useful positive to move the use of technology into schools because it is used in daily-life"*. (Before training, PT10, Survey questionnaire)
>
> "*It is a shortcoming to instruct lessons lacking of daily-life. In order to better understand the lessons, examples are needed to be chosen from daily-life. This can also be achieved with FATİH Project*". (After training, PT15, Interview)

For the process of instruction, pre-service teachers' opinions were focused on saving time, providing rich material opportunities, increasing the effectiveness of the lessons both before and after the training. In addition, pre-service teachers stated ideas about consolidation of the lessons (f=2, 13%), reduction of teachers' load (f=2, 13%), student-teacher interaction (f=1, 7%) and effective instruction (f=1, 7%) for the benefits of the project after the training. In this context, the training provided for pre-service teachers contributed to them in such a way of diversification and deepening of their opinions about the project. After the training, PT2, PT3, PT7, PT9 indicated the following statements related to this category.

> "*Due to readily available presentations, questions and examples, it saves time*". (After training, PT2, Survey questionnaire)
>
> "*As the benefits of FATİH Project, it saves much time and it provides students with permanent learning because of the chance of showing them more materials*". (After training, PT3, Survey questionnaire)
>
> "*The teacher will not lose time by writing*". (After training, PT7, Survey questionnaire)
>
> "*I believe that it would be beneficial for education and teaching. More efficient lessons will be provided by providing economy in lessons*". (After training, PT9, Survey questionnaire)

Investigating the findings related to the category of belief/interest, the focus was on enhancement of students' interests to lessons and lessons being enjoyable before and after the training. In addition, pre-service teachers stated that the project contributes to the enhancement of students' motivation to lessons (f=4, 27%) and the decrease of their prejudgments to the lessons (f=2, 13%) after the training. Moreover, two pre-service teachers (13%) did not give any responses before the training. On the other hand, all pre-service teachers give responses about the benefits of the project after training.

Pre-service mathematics teachers' opinions about the unfavorable aspects of the FATİH Project were presented in the Table 4. The categories and codes under this theme formed from their opinions before and after trainings were as follows.

Table 4.

Pre-service Mathematics Teachers' Opinions about the Unfavorable Aspects of FATİH Project.

Categories	Codes	Before the Training		After the Training	
		f	%	f	%
Technical Deficiencies	Possibility of power cut during lesson	1*	7	4	27
	Interactive boards or tablet-computers may be broken.	1	7	3	20
	Touch-sense of interactive board may be broken	-	-	3	20
	Internet may be cut during the lesson	-	-	2	13
Teacher-Induced Deficiencies	Teacher may not use the software in interactive board (Being lack of software knowledge)	4	27	10	67
	Teacher may not know the properties of interactive board (Being lack of hardware knowledge)	-	-	5	33
	Teacher may lose control of the classroom management while using interactive board.	1	7	4	27
	Teacher may lack of experience in using technology.	2	13	4	27
	Teacher-induced time lost may happen	2	13	3	20
	Teacher may fail in planning the lesson (Not adding the necessary materials or uploading software)	-	-	2	13
Student-Induced Deficiencies	Students may consider the interactive board and tablet computer as a gaming tool.	1	7	6	40
	Students' attentions may be distracted.	2	13	5	33
	Students may not know how to use them	2	13	5	33
	Interactive board and tablet-computers may be used out of purpose.	1	7	3	20
	They may prevent persistent learning.	-	-	3	20
	Students may become passive listeners	-	-	2	13
	Students' writing skills may be reduced.	1	7	1	7
	Students' note taking habit may diminish	1	7	1	7
Miscellaneous	They may not be appropriate for all lessons.	2	13	5	33
	There may be security problems.	-	-	1	7
	No idea	2	13	-	-

*Each pre-service teacher may state more than one response.

When the Table 4 was investigated, pre-service teachers' opinions about the unfavorable aspects of FATİH Project were concentrated in three categories. These categories were *technical deficiencies, teacher induced and student induced deficiencies* arising from technologies (interactive board, tablet-

computer, internet, etc…) introduced in FATİH Project. Although pre-service teachers' opinions about the possible deficiencies of FATİH Project were limited before the training, it was observed after the training that their opinions were differed in both diversity and depth.

Before the training, one pre-service teacher (7%) mentioned about the power cut during the lesson, while another pre-service teacher (7%) stated that interactive board or tablet-computer distributed might be broken while using them. In addition to the possibility of power cut (f=4, 27%) and breakdown of interactive boards and tablet-computers (f=3, 20%), on the other hand, they stated the possibility that touch sense of interactive board may make trouble for teacher (f=3, 13%) and that the internet may be cut during the lesson (f=2, 13%), so, there may happen disruption in the lessons in which the internet is required. Therefore, pre-service teachers indicated that if the lesson planned were prepared with the necessity of intensive use of technology, the teacher may encounter problems during the instruction of the lessons with possible technical deficiencies. In pre-service teachers' applications, they experienced difficulties especially in using some interactive boards due to very sensitive touch screens. Even the slightest touches were perceived, they faced problems such as page shifts, undesired segment selection on the screen and deletion of the operations being performed.

After applying the survey questionnaire and interviews conducted, teacher induced deficiencies were determined as second category among the possible unfavorable aspects related to FATİH Project. Pre-service teachers had predictions about this issue before the training provided. Pre-service teachers indicated that teachers may not know how to use software in interactive board and tablet-computer (f=4, 27%), teachers may encounter problems due to lack of experience in using technology (f=2, 13%), there may technology use related time-loss during lesson (f=2, 13%), and teachers may lose classroom management during using technology (f=1, 7%). In this context, some of pre-service teachers stated the followings.

> "*Many teachers still do not know how to use computer and upload software. I guess the instruction was done on some software in interactive boards. I mean a teacher who does not know how to use computer may have trouble using a smart board*". (Before the training, PT14, Interview).
>
> "*During instructing the lesson, teacher who use smart board may lose time while dealing with smart board. Students are already tend to disrupt the lesson*." (Before the training, PT12, Interview)

In addition to further deepening of these opinions, two additional codes were added under this category after the training provided. According to pre-service teachers' opinions, teachers may encounter with problems in using software (f=10, 67%) and lack of hardware knowledge (f=5, 33%). Pre-service teachers were not able to do some things that they wanted to because they did not have all the features of the interactive boards in their practices. For example, they experienced difficulties such as that they

had to perform some operations again after a wrong section is touched on the screen. They also faced problems during enlarging or reducing the desired section on the screen or opening two or three dimensional shapes in Antropi. In addition, teachers' unplanned entry to the classroom, which means that teacher does not make the necessary software and documents available before the lesson, (f=2, 13%) was also considered to be one of the unfavorable aspects that could be encountered. Related to this issue, pre-service teachers indicated the following statements.

> "*I think teachers should know how to use smart boards in terms of both software and physical things. In addition to not knowing mathematical software such as Geogebra and Derive, not knowing how to use the applications like Anthropi or e-book and problems that can be encountered related to integrated parts of smart board may also disrupt the flow of the lesson. Such things, I think, may hinder the effective uses during lessons*". (After training, PT10, Interview)
>
> "*Teacher should prepare everything and upload to the smart board before the lesson begins. If s/he tries to do it during lesson, s/he lose time both during uploading the software and opening it*". (After training, PT6, Interview)

In the applications performed, one of the problems that pre-service teachers experienced was that students tried to intervene the pre-service teachers in the slightest problem because they establish similarity between the uses of tablet-computers and interactive boards. Therefore, it was observed that they lost the control of classroom management. For this reason, they lost time during the instruction. According to the findings gathered from pre-service teachers, student-induced deficiencies were also found among the possible unfavorable aspects of FATİH Project. Before the training provided, pre-service teachers' opinions were focused on that students may consider interactive board and tablet-computer as a gaming tool (f=1, 7%), these technologies may result in distraction in students' attention (f=2, 13%), students do not know how to use these technologies (f=2, 13%), students use these technologies out of their purposes (f=1, 7%), that students' writing abilities may be reduced (f=1, 7%) and their note taking habit may diminish (f=1, 7%). According to pre-service teachers' opinions, on the other hand, two new codes were added in addition to the increase in the frequencies of these codes. Pre-service teachers emphasized that the possibility of decrease in students' permanent learning (f=3, 30%) may appear and students may become passive listeners (f=2, 13%), therefore, what was expected from students and what was the purpose of the project may contradict if such technologies are not effectively used. Particularly, pre-service teachers expressed the students' consideration of interactive boards and tablet-computers as a gaming tool and using them out of purpose in the following way.

> "*As far as I can see, the students are formatting the tablet-computers and upload games*". (After the training, PT9, Survey questionnaire)
>
> "*I heard students use smart boards to watch movies and something*". (After the training, PT10, Survey questionnaire)
>
> "*When I went to the school for school practice, I saw that students generally used the smart boards for watching movies and listening to music*". (After the training, PT11, Interview)

Related to this category, it was observed that students were prone to use the interactive boards out of purpose during the applications that pre-service teachers performed. It was observed that students expected to use the board for listening to the music and watching videos. Since they were affected from the other lessons, it was seen that they wanted to use interactive boards for a gaming tool.

Pre-service mathematics teachers' opinions about the applicability of FATİH Project was presented in the Table 5. Pre-service teachers were asked to answer which factors were effective for achieving the success of the project. According to their responses, the categories of *the training provided, the teacher's effect and school condition* appeared. In addition, six pre-service (40%) did not give any response for the applicability of the project before the training. After the project, on the other hand, both there was no pre-service teacher without response and the deepness of the data increased.

Table 5

Pre-service Mathematics Teachers' Opinions about the Applicability of FATİH Project

Categories	Codes	Before the Training		After the Training	
		f	%	f	%
Related to Training Provided	In-service training should be provided	2*	13	7	47
	The effectiveness of the in-service training provided should be monitored	-	-	4	27
	In-service training particular to mathematics domain should be provided	-	-	4	27
	The training provided should be practical	-	-	3	20
	There should be audit towards teacher's implementations	2	13	5	33
	Teachers should plan the lesson before the instruction	-	-	4	27
Related to Teachers Effect	Teachers should use technologies that fit the purpose	2	13	4	27
	Teachers should be equipped in technology use and in the implementation of the project (equipped with necessary knowledge in using interactive board and tablet computers, etc…)	1	7	3	20
	Teachers should monitor students	-	-	3	20

Categories		Codes	Before the Training		After the Training	
			f	%	f	%
Related to School Condition		It cannot be used in all schools	1	7	-	-
		The class size should not exceed a particular number	1	7	5	33
		Widespread use among teachers should be encouraged	2	13	6	40
		No idea	6	40	-	-

*Each pre-service teacher may state more than one response.

National Ministry of Education provides trainings for the applicability of the FATİH Project. According to pre-service teachers' opinions, the first category appeared was about these trainings. Before the participatory training to pre-service teachers for this project, they gave superficial responses related to this category. Two pre-service teachers (13%) indicated that there should be in-service training for this project. After the preparatory training provided, there were various ideas given by pre-service teachers. In addition to pre-service teachers' opinions advocating necessity of providing in-service training (f=7, 47%), some pre-service teachers advocated some ideas that there should be in-service training particular to mathematics domain (particular to each domain) (f=3, 20%), these trainings should be practical (f=3, 20%), and their effectiveness should be monitored (f=4, 27%). Some pre-service teachers stated the followings for this category.

> "*I know in-service trainings are provided in schools. However, these are for general use. The training should be provided. However, the trainings should be given particular to mathematics domain as similar to the training provided for us*". (After the training, PT10, Interview)
>
> "*As far as I can see in my school practices, those who took training were even not using smart board. In addition, there is no one to check*". (After the training, PT6, Survey questionnaire)
>
> "*When I talked to the teachers, they said that the training provided was theoretical*". (After the training, PT7, Survey questionnaire)

Pre-service teachers have taken the teacher's effect into consideration for the actively and effectively applying the project. Before the preparatory training provided, pre-service teachers mentioned about the necessities such as that there should be audits for the teacher's implementations (f=2, 13%), the technologies used should be appropriately used by teachers for their own purpose (f=2, 13%) and teachers should be equipped for using technologies (f=1, 7%). According to pre-service teachers' statements, for example, it was a contrary situation that the interactive boards were used only for watching movies. On the other hand, the project insists that FATİH Project technologies should be used appropriately. According to pre-service teachers' opinions after the training provided, on the other

hand, pre-service teachers mentioned the necessities that teachers should plan the lesson before doing instruction (f=4, 27%) and teachers should monitor students in such issues (f=3, 20%), in addition to the situations mentioned for the purpose of reaching the projects' aims.

According to the data gathered from pre-service teachers, one pre-service teacher (7%) stated that the project cannot be applied in all schools before the training. However, there was no pre-service teacher who had this thought after the training. In addition, five pre-service teachers (33%) considered the classroom size as one of the important factors for effectively applying the project. Moreover, six pre-service teachers (40%) emphasized the necessity of implementing applications for encouraging the use of technologies provided in schools in order to achieve the projects' goals.

Pre-Service Mathematics Teachers' Opinions about the Technology Use in Teaching Mathematics

Pre-service teachers were asked about their opinions on using technologies in their mathematics lessons. Under the lights of data gathered from survey questionnaires and interviews, the findings were summarized in Table 6.

Table 6.

Pre-Service Mathematics Teachers' Opinions about Technology Use in Mathematics Lessons

Codes	Before the Training		After the Training	
	f	%	f	%
Content can be created with dynamic geometry software	4*	27	9	60
Visualization is provided in the lessons	5	33	8	53
The comprehension of the concepts in the lessons can be facilitated.	3	20	6	40
It provides concretization of the concepts.	1	7	5	33
Simple and memorable mathematical examples can be given	-	-	5	33
Students' interests to mathematics increases	3	20	3	20
A link between mathematics and daily-life can be provided.	-	-	3	20
The spatial thinking can be supported.	-	-	3	20
It allows the use of educational games.	-	-	2	13
Classroom environment that appeals to different sense can be provided	1	7	2	13
Many questions can be solved in lessons.	4	27	2	13
Students' active participation can be ensured.	3	20	2	13

Codes	Before the Training		After the Training	
	f	%	f	%
The interdisciplinary studies can be supported.	-		1	7
Mathematical misconceptions can be avoided.	-		1	7

*Each pre-service teacher may state more than one response.

As seen in the Table 6, pre-service teachers stated before the training that FATİH Project may contributed to the situations in mathematics course such as adding visualization to lessons (f=5, 33%), facilitating the comprehension of the concepts (f=3, 20%), increase in students' interests to the mathematics (f=3, 20%) and solving many questions in classroom (f=4, 27%). The benefits such as adding visualization to the lesson, solving many questions and increase in students' interests have emerged as the opinions about using technologies for presentation purposes. In addition to the stated benefits of the projects, in-depth opinions particular to mathematics lesson appeared after the preparatory training provided. In addition to the benefits that pre-service teachers stated before the training, they indicated positive aspects such as that teachers can present mathematical examples which are easy and memorable (f=5, 33%) and related to daily-life (f=3, 20%). Moreover, they mentioned ideas about improving students' spatial abilities (f=3, 20%) by integrating different mathematical software and educational games (f=2, 13%) into lessons. In addition to this, some pre-service teachers stated that project supports the interdisciplinary studies (f=1, 7%) and is beneficial in preventing mathematical misconceptions (f=1, %7). It was observed that pre-service teachers' opinions towards project became deeper with the training provided. Some pre-service teachers' opinions about FATİH Project in context of mathematics lessons were presented below.

> "*For example, I can show the expansions of three dimensional object and their appearances from different angles to students by uploading mathematical software such as Geogebra to smart board. Therefore, I can both ensure students to better understand these subjects and improve students' abilities of three dimensional* (spatial) *thinking*". (After the training, PT5, Interview)
>
> "*As the technological tools are found in any points of our lives, they became an integral part of daily-life. I can attract students' attention and give various examples from daily-life by using these technologies in mathematics lessons*". (After the training, PT13, Interview)
>
> "*EBA and e-books help me to solve many question without loss of time*". (After the training, PT6, Survey questionnaire)

Before and after the preparatory training provided, pre-service teachers were asked which technologies should be used in mathematics lessons and how. Under the findings, three categories appeared. Pre-service teachers mentioned about *the technological tools, software and educational portals* in general terms when indicating about the technologies they can use. These themes were summarized in the Table 7.

Table 7.

The Technologies that Pre-Service Mathematics Teachers can Use in Mathematics Lessons

Categories	Codes	Before the Training		After the Training	
		f	%	F	%
Technological Tools	Interactive board	9*	60	15	100
	Computer	10	67	14	93
	Tablet-computer	2	13	11	73
	Smart phones	1	7	7	47
	Projector	4	27	1	7
	Antropi Teach	-	-	15	100
Software	Dynamic geometry software (Sketchpad, Geogebra)	5	33	13	87
	Enriched e-book (e-book)	-	-	13	87
	Office software (Word, Excel, Powerpoint)	3	20	12	80
	Video processing software (movie-maker)	-	-	7	47
Educational Portals	Educational information network (EBA)	-	-	11	73
	Special portals such as Vitamin, Morpa	-	-	9	60
	Other (Educational documents and internet sites providing educational games)	3	20	9	60

*Each pre-service teacher may state more than one response.

Considering the Table 7, pre-service teachers stated that they often use traditional technologies before the training. They mentioned that they could use computer (f=10, 67%) and projector (f=4, 27%) in the lessons. They also mentioned that the interactive boards (f=10, 67%), which was the best known point about the FATİH Project, could be used in the lessons. As software, they said that they could use dynamic geometry software (f=5, 33%) and Office software (f=3, 20%) such as Word and Excel. In addition, they indicated that they could benefit from different sources on the internet. When asked about how to use these technologies, they indicated that they could present readily available sources and transfer to the students by means of computers and projectors. Similarly, they stated that they could use dynamic geometry software documents that can be found in different portals on the internet in the lessons. From their statement, the perception of that they would often use readily available contents appeared.

After the training provided, on the other hand, it was observed that there were various sources they would use in each category. Pre-service teachers who stated opinion about only using the readily available content before the training indicated that they would use technologies particular to aims of teaching mathematics after the training. They firstly indicated that they would actively use interactive board (f=15, 100%), tablet-computer (f=11, 73%), computer (f=14, 93%) and smart phones (f=7, 47%) when considering the technologies. Pre-service teachers stated that they would use interactive boards instead of projectors since the FATİH Project is encompassing all schools. As an interesting finding,

they mentioned the tablet-computers and smart phones as technologies to use in mathematics education. PT10 used the following statement below.

> "*I know that the smart boards work similar to computers do. Namely, I think I can do instructions more effectively by uploading mathematical software. Similarly, this software can also be uploaded to tablet-computers and smart phones. For example, I can do various applications with Geogebra (dynamic geometry software). Especially in geometry lessons*". (After the training, PT10, Interview)

As software, teachers stated that they would use dynamic geometry (f=13, 87%) and Office software (f=12, 80%) in mathematics lessons. In addition, it was observed that teachers were aware of the e-books particularly prepared for lessons encompassed in FATİH Project and of Antropi Teach software (f=15, 100%) readily uploaded to interactive boards. Pre-service teachers were asked how to use the software in mathematics teaching. They gave the following responses.

> "*I can use Excel to do algebraic operations and PowerPoint to show three dimensional shapes*". (After the training, PT4, Survey questionnaire)
>
> "*e-books are useful while solving questions. I can solve many questions within a short time interval*". (After the training, PT6, Survey questionnaire)
>
> "*I can do many activities with Geogebra. Especially in geometry lessons*". (After the training, PT10, Interview)
>
> "*For example, by merging videos that I found on the internet related to mathematics with Movie-maker, I can motivate my students at the beginning of the lesson I instructed*". (After the training, PT14, Survey questionnaire)

Before the training, pre-service teachers were not aware of the Educational Information Network (EBA) presented within the scope of FATİH Project and the social education platforms providing readily available content such as Vitamin and Morpa offered by private companies through these portals. After the training provided, on the other hand, most of the pre-service teachers stated that they would actively use these platforms. They stated that they consider this platform (EBA) very useful in terms of both downloading readily available content and seeing other mathematics' teachers' applications.

Discussion and Conclusion

After investigating the findings related to definition of FATİH Project, it was observed that the level of pre-service mathematics teachers' awareness about the FATİH Project was not adequate. As similar to most people around, pre-service mathematics teachers, who are the teachers of the future and are first degree addressee of the FATİH Project, have about the same level of knowledge about the FATİH Project. It was seen in pre-service teachers' definition that there were similar perceptions of society such as the distribution of tablet-computers and the use of interactive boards (Pamuk et al., 2013). It

has also been observed that some pre-service teachers did not have any idea about the project. Despite the fact that they would meet with this project in the school environment where they would begin to work as teachers in the near future, their lack of knowledge about the content of the project is a shortcoming that needs to be addressed (Kayaduman et al., 2011). After the preparatory training, it was observed that their definitions were deeper and appropriate for the aims of the project. In this context, Usta and Korkmaz (2010) and Wachira and Keengwe (2011) emphasized the necessity of providing training to teachers for technology use so that the use of technology in education is more effective.

Pre-service mathematics teachers expressed that the training provided for the applicability of the project was practical and necessary for teachers. They also stated that it has great influence for teachers who were its practitioners to reach the goals of the project. Banoğlu et al. (2014) indicated that the in-service trainings for teachers were insufficient when taking this issue into account. Similar findings were also found in Yıldız, Sarıtepeci and Seferoğlu's (2013) studies. Considering the findings about the applicability of the project, it was revealed that these trainings should be given during university education and they should be practical. Some pre-service teachers' statements about the necessity of the training provided to be mathematics domain specific coincided with the Aktaş et al.'s (2014) recommendations about the necessity of in-service trainings for FATİH Project to be domain specific for each domain. It was known that the in-service trainings provided by National Ministry of Education for FATİH Project were given to teachers from different branches together and were theoretical. Therefore, it was a heated debate about how much the trainings were effective for teachers (Kayaduman, et al., 2011). Considering teachers' old habits and fears, some situations such as use of technology that teachers were not interested at all (Wachira & Keengwe, 2011) make the effect of training provided controversial. In addition, the relation between pre-service teachers' experience in using technology and their sufficiencies and self-efficacies in using technologies of FATİH Project was indicated in Topal and Akgün's (2015) study. Theoretically provided trainings are not expected to make much contribution to the development of teachers' perceptions about these issues.

If the mathematics education was considered specifically, the need for visualization and concretization of the concepts (Zengin et al., 2013) appears in mathematical activities due to the abstract nature of mathematical concepts (Olkun & Uçar, 2003). Although visualization and concretization of the mathematical concepts were merely found in studies related to FATİH Project (Daşdemir et al., 2012; Gürol, Donmuş, & Arslan, 2012), it was interesting that pre-service mathematics teachers emphasized these points in their opinions regarding the positive aspects of FATİH Project. For example, considering the findings related to the software that pre-service mathematics teachers would use, the importance of dynamic geometry software emerged. This is because this software helps to visualize and concretize the abstract mathematical concepts (Zengin et al., 2013). Although this software is not important for

other branches, it a useful tool that makes the lessons more effective for mathematics teachers and students (Baki, 2015; Kabaca & Tarhan, 2013; Zengin et al., 2013).

It was observed that pre-service mathematics teachers focused on the positive aspects of FATİH Project related to course content, the effectiveness of the lessons and students' interests to the lessons. On the other hand, pre-service mathematics teachers focused on technical deficiencies, teacher and student induced deficiencies when considering its possible unfavorable aspects. Taking particularly the teacher induced deficiencies into account, pre-service teachers indicated that they were lack of software knowledge, which brought the discussion of necessity for mathematics domain specific training (Yıldız, Sarıtepeci, & Seferoğlu, 2013). This is because special software for mathematics lesson (e.g., dynamic geometry or computer algebra software) was not in the content of in-service training provided. In pre-service teachers' opinions about the technologies and software that can be used in mathematics lessons, they stated that they would prefer to use Excel in algebraic operations, PowerPoint in presenting three dimensional objects and dynamic geometry software in geometry subjects. Therefore, it was revealed that the use of technology diversifies according to the branches and it was necessary that the trainings in this area should be special to the branches (Aktaş et al., 2014).

It was observed in the application done by pre-service teachers that they experienced some of the unfavorable situations that they indicated in the interviews. For example, the difficulties in using the software on the interactive board, the sensitivity in touch screen and students' intervention to the technologies used during the lesson were among these situations. Although their applications were done in limited time interval, it was observed that pre-service teachers gained experience and indicated their opinions accordingly. From this point, these findings were coinciding with the findings of Topal and Akgün's (2015) study. The training provided should include practical applications. Therefore, teachers or pre-service teachers would gain experience in using these technologies and see themselves better using technologies of FATİH Project.

In pre-service mathematics teachers' opinions towards FATİH Project regarding mathematics lessons, the possible benefits of using e-books such as increasing visualization in mathematics education, solving abundant questions and reducing teachers' burden have emerged when considering the pre-service teachers' opinions about the technologies and software that can be used in mathematics lessons. In Eren and Yurtseven-Avcı's (2016) study, it was stated that the preparation of e-content takes too much time, teachers need readily available content and there was need for knowledge of higher level of technology usage. At this point, e-books would be helpful and useful for teachers in the way of providing teachers with readily available content and being easy to use.

Before the training, pre-service teachers indicated the benefits of using technology in the lessons regarding the mathematics course such as concretization of mathematical concepts, providing visualization, solving many questions in the lessons. These statements emerged as superficial reflections of the possible benefits of using technology. After the training, it was observed that the pre-service teachers made more in-depth reflections particularly for mathematics lessons. Among them, they indicated that technology would be useful for improving students' spatial abilities and developing their problem solving abilities by using mathematical software and by presenting easier questions from daily-life in classroom environment. These findings also coincide with Özen and Yavuzsoy-Köse's (2013) findings. Development of these abilities is also found among the basic skills for students to be developed in secondary school mathematics education curriculum (MoNE, 2013). In addition, pre-service teachers indicated that using these technologies in the lessons would play positive role in supporting interdisciplinary studies and in preventing mathematical misconceptions. Baki (2008) mentioned that similar benefits were observed in the efficient use of technologies in mathematics lessons.

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Research Article

Examination of Technological and Pedagogical Properties in Short Film Designs[1]

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Abstract

Establishment of technology assisted environments suitable for new teaching programs has become more of an issue each passing day. From this aspect, Teaching Technologies and Material Design (TTMD) course comes first as applied courses modeling the knowledge generation in pre-service teacher education. One of the teaching activities within the scope of this course is the activities of pre-service teachers for short film preparation and application. Ministry of National Education (MEB) encourages the short film designs through Education Informatics Network (EBA). Integration of technological and pedagogical knowledge that pre-service teachers have within the frame of content knowledge to be taught has been aimed with this kind of activities. This study includes the examination of technological and pedagogical properties of scripts of early childhood pre-service teachers in short film designs. In this research that has been performed with pre-service teachers in KTÜ (Karadeniz

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Technical University) Fatih Faculty of Education, Early Childhood Education Department, short film production towards the suitable ones for the zones of development and objectives within the MEB Early Childhood Education Program (2013) was asked from groups of four. 5 films selected by criterion sampling method from educational short films prepared, were examined in terms of technical skills, suitability for pedagogical learning objectives and child development, varieties of representation, and knowledge of learner (pre-conceptions and learning disability characteristics). Results refer to that short film contents are suitable for zones of development with pedagogical learning objectives indicators in this type of scripting beside the film preparation skills in terms of technical skills, It has been seen that even if a variety of representation in terms of early childhood education was provided, there are not enough applications characterizing the pre-conceptions in short film contents.

Keywords: *Short film, design, technology, pedagogy*

Introduction

The best way of providing the qualification for the applications of the current technologies in teaching-learning processes to teachers is possible with pre-service education and therefore with the environments provided in Teaching Technologies and Material Development/Design (TTMD) courses that are available in teacher education programs (Gündüz & Odabaşı, 2002). It can be said that the pre-service teachers taking this course go along with the course (Bektaş, Nalçacı & Ercoşkun, 2009). It has been expressed in a research that pre-service teachers care about material preparation and application in teaching in terms of attention getting, permanent learning and learning motivation with the teaching applications performed within the scope of TTMD course, as expressed in their own statements.

When investigations on TTMD courses are examined, it can be seen that they usually cover the in-service and pre-service teachers. It has been seen that science and technology teachers believe the necessity of using materials for effective teaching in courses they teach (Karamustafaoğlu, 2006), go along with textbooks but still need different materials (Kurnaz & Yiğit, 2012), and yet their material using/development levels are not in desired level. Additionally, Şahin (2015) reported that textbooks, written documents and whiteboards have been used most as teaching materials by teachers. In addition, he has determined that teaching materials of teachers have the role of interest and attention getting, knowledge concretization, and student motivation. In a similar way, Metin, Birişçi, and Coşkun (2013) have indicated that teachers exhibit positive attitude towards teaching technologies.

When investigations on pre-service educational institutions are examined on the other hand, it can be seen that they focused on what the most distinct examples in various disciplines are, and how the preparation of these would contribute to pre-service teachers and students. Alım (2012) has reported that visual material preparation for geography education can be taught to teachers and students, and Inan (2006) has introduced sample materials, that can be prepared, emphasizing the significance of material development in mathematics education. Similarly, Hırça and Genç (2012) has reported that a lot of skills can be provided to the students who lack the proficiency regarding the use of technology in science education by preparing a PPT presentation, and he introduced a sample application for it. Karataş and Yapıcı (2006) have

emphasized the necessity of sampling in content by giving examples of 2-3D visuals that were prepared in TTMD course as well as couple of years of experience.

Moreover, there are different evaluations regarding the pre-service teachers who have been taken and completed the TTMD-related courses in the report mentioned above. Güven (2006) has emphasized that pre-service teachers who have taken the course, recently called TTMD, couldn't gain most of the technical skill (psychomotor) content behaviors that were expected to be gained within the scope of this course. However, Alım (2015) emphasized that behaviors in all areas have been gained but skill learning objectives have been learned less compared to others. Kolburan-Geçer (2019) reported that pre-service teachers know how to benefit the equipment to be used in classrooms in learning-teaching processes, and they have realized the importance of developing their own materials in future. In short, applications in TTMD course develop the learning objectives in knowledge and awareness level more compared to those in skill level. In pre-service teacher education programs, the properties of the teaching program of the course to be taught in MEB should be taken into consideration (Güven, 2006). Based upon this point, it arises those pre-service teachers who study in different programs should be present more in the studies that specific for their own fields. One of the studies made in this direction is short film making applications.

If short films are towards the learning objectives in teaching programs, they are called 'educational films' (Akbaş, 2011). Many positive behaviors such as learning activities planning, application, reflecting thinking on own experiences, and interpretation of learning process are expected to be gained by pre-service teachers through educational films to be prepared (Akbaş, Canoğlu & Ceylan, 2015). In addition to this, it has been determined in a study in which advantages and deficiencies of the educational films made by pre-service teachers are evaluated also by middle school students that the short films are useful in issues such as 'applied discourse' , 'giving a concise knowledge in a short time' , 'creating awareness' (Akbaş, 2011).

Nowadays, internet has made it possible reaching to short films with adaptation of advanced cameras into cell phones and computers. Moreover, editing software programs such as Windows Movie Maker have provided a significant contribution for production and becoming widespread of the educational short films (Yiğit, Alev, Özmen & Akyıldız, 2012). Short films production has become viable for students in all age groups. Even if the use of

technology in early years has been causing arguments in terms of its developmental suitability for children, researches has emphasized the positive influences of the technology on cognitive, social and emotional development of the children (Chen & Chang, 2006). Similar researches emphasize that computers support the development of communication, problem solving, memory skills (Haugland, 1992), mathematics skills (Clements, 1999; Clements & Samara, 2003; Kaçar & Doğan, 2007), and reading and writing skills (Clements, 1994; Ihmedieh, 2010; Judge, 2005) of the children. When the importance of the films in developments of children, especially in certain age groups (Şahin, 2015; Yağlı, 2013) are taken into consideration, both the significance of the educational short films will be noticed and their skills related to current technologies will be developed by education faculty pre-service teachers to perform this kind of applications in TTMD course (Akbaş, 2011). It has been emphasized on MEB (2009) pre-school teachers special content adequacies that it would be possible to be a model for students by developing preparation skills for the materials which are clear, understandable, and suitable for children's developmental levels. Supporting of the information and communication technologies for development and learning of the children is directly related with effective and proper integration of teachers into pre-school education program (Bayhan, Olgun & Yelland, 2002; Haugland, 2000). For this reason, teacher education is quite important for computers to be used effectively and as an effective learning tool. It's quite important to support teacher both in pre-service and in-service for them to use the computers in the early childhood years that covers the critical period of development and learning.

In recent years, a conceptual model called Technological Pedagogical Content Knowledge (originally TPCK, now known as TPACK) (Koehler & Mishra, 2005) based on Shulman's (1986/1987) Pedagogical Content Knowledge (PCK) model has been commonly used in education researches for the examination of knowledge basis of teachers. PCK was first introduced by Shulman, and includes both Content Knowledge (CK) and Pedagogical Knowledge (PK) components but it has been considered as a new type of knowledge that is completely different from these two knowledge types. Usually, PCK has been described as the transformation of CK into a form that is more understandable for students (Geddis, 1993; Grossman, 1990; Shulman, 1986, 1987). According to Shulman's (1986/1987) PCK model, PCK components are knowledge of learner (pre-conceptions and student difficulties), and knowledge of varieties of representation. Varieties of representation knowledge used in transformation of CK into a more understandable form by students are critical. This type of

knowledge includes the knowledge for different representation varieties of the content to be taught, and it has many kinds such as simulation, visualization, exampling, illustration, and demonstration (Shulman, 1986). Since most of the studies regarding the determination of varieties of representation in literature are on science (Friedrichsen, 2008; Geddis, Onslow, Beynon & Oesch, 1993; Henze, Van Driel & Verlop, 2008) and due to the lack of studies regarding the early childhood teachers or pre-service teachers, technical and pedagogical characteristics of the scripts for short film designs of early childhood pre-service teachers were examined in this research. What seen in TPACK, based on Shulman's (1986/1987) PCK model is the presence of technology in learning and teaching environments, which indeed are different, and the necessity of teachers to have the knowledge for this technology. Moreover, the most important issue for pre-service teachers' education in accordance with TPACK model is the necessity of presenting of the courses covering this different knowledge basis cooperatively (Koehler & Mishra, 2005) instead of arranging separate courses for each knowledge content in traditional teacher education programs. Koehler and Mishra (2005) have stated that a contribution was provided to develop a new approach regarding the relationship among content, pedagogy, and technology by teachers with "learning by design approach" that has been proposed and used by teachers for the development of TPACK. In this direction, it has been aimed to analyze the scripts in short film designs of pre-service teachers regarding the teaching of the contents determined from teaching programs, and examine the development of TPACK components with this study.

Method

Multiple case study to examine technological and pedagogical characteristics of short films prepared by early childhood pre-service teacher was used in this study. As Merriam pointed out (1998), a case study provides an opportunity to deeply analyze and describe a single unit such as individuals, programs, and groups or systems of which limits are certain.

Data Collection Process and Data Collection Tools

This study was performed with students who took Teaching Technologies and Material Design (TTMD) course in KTÜ Fatih Education Faculty, Early Childhood Education Program in 2015/2015 academic year. Preparation methods for visual content designs and software

programs related with short film making (such as Movie Maker) and properties were introduced to pre-service teachers in detail within the scope of this study. With regard this application, short film making towards the suitable ones for the zones of development and objectives within the MEB Early Childhood Education Program (2013) was asked from groups of four. It has been mainly expected from the pre-service teachers to create scripts which involve the characters of a group of 5-6 years of age including themselves in films prepared The first draft applications of the films have been watched with all pre-service teachers, who have joined the course, together, and the precautions to be taken for the films focusing more on designated learning objectives were discussed. Two weeks after first feedbacks, 14 films on which necessary arrangements were made, were put on a display in class environment. 5 out of short film design of 14 groups that were put in the final form by this were selected by criterion sampling method. In researches in which criterion sampling was used, observation units can be formed out of individuals who have certain characteristics, events, objects or situations, and units, fulfilling the criterion designated for sampling, are taken in the research (Büyüköztürk, Kılıç Çakmak, Akgün, Karadeniz & Demirel, 2009). In this regard, at least two development fields/skills, and the selection of learning objective indicator regarding this zones were designated as criterion for selecting the films, and film selection was made in this direction. (All the related development fields/learning objectives indicators can be reached from MEB Early Childhood Education Program (2013)).

Analysis of Data

Films selected were analyzed in terms of technical skills, suitability for pedagogical learning objective and child development, varieties of representation, and student knowledge. Analysis of the suitability for learning objective and child development were performed by a specialist from early childhood education, and analysis for variety of representation and student knowledge by a specialist who has made investigations in pedagogical content knowledge from science education due to the fact that the topic given to the teachers was related with the environment. While doing this analysis, explanations on related-development field and learning objective indicators present in MEB Early Childhood Education Program (2013) were primarily examined. At the same time, an evaluation was made considering the properties of suitability for a child, proximodistal, from the known to the unknown, clarity, from concrete to abstract, economy, vitalness, learning by practicing and experience. A

consensus was reached on the suitability of short film script contents for child development by the field specialists that performed the evaluation.

Table 1
Varieties of Representation, and Teaching Activities Referring the Varieties of Representation

Variety of Representation	Teaching Activity
Explanation	Illustration, Verbal expressions.
Demonstration	Making an explanation regarding the tool, being a model, illustrating and asking them to make
Exampling	Relating with daily life
Teaching by play	Playing a game
Teaching by music	Giving the content by music

Content analysis was utilized in determining student knowledge and varieties of representation from the pedagogical properties in short films within the scope of this study. Short films have been watched by field specialist independently, and varieties of representation that pre-service teacher used in scripts were determined. Data regarding the varieties of representation were analyzed by deductive analysis based on the categories of presentation, simulation, visualization, exampling and explanation described by Shulman (1986), as the varieties of representation are determined by different categories in a way of learning by play and music coming out of the data, inductive and deductive analysis was used together. The varieties of representation and teaching activities referring these varieties in short films were listed in Table 1. An absolute consensus was reached between the specialists for the varieties of representation determined in short films. Since inductive analysis gives an opportunity to explain the cases that are not previously known through content analysis, inductive analysis was also used in analyzing the student knowledge of the pre-service teachers in short films Short films were represented as F1, F2, F3, F4, and F5. F1 is 3 minutes and 17 seconds, F2 is 3 minutes and 14 seconds, F3 is 5 minutes and 1 second, F4 is 3 minutes and 2 seconds, and F5 is 4 minutes and 7 seconds.

Films were arranged by Window Movie Maker. As each group produces their own film, technical properties that they have used in the software program were also examined in these arrangements. As all videos of the groups selected for technical analysis were displayed in

classes, properties were determined as well. These properties are shown in Table 1. By using the properties in Table 1, the videos of the faculties teaching the course were marked in different time intervals twice and last versions (100% compatibility) were shown in results. In order to have a precision in the research, the process is explicitly expressed and research results were supported by raw data.

Results and Discussion

In this section, the results regarding the technical skills, the suitability for pedagogical learning objectives and child development, the varieties of representation together with pre-conceptions components have been presented. Short films were represented as "F1.....F5"

Technical Skills

As can be seen from Table 2, addition of descriptive information on film, video recording, arrangements of the recordings were performed by all groups. No group has benefited from previously prepared videos for their own film designs. Moreover, while only one group has used acceleration property, three groups have favored to add a film to films depending on the characteristics of the topic.

Table 2
Technical Skills that Pre-Service Teachers Used in Software Programs in Film Designs

	F1	F2	F3	F4	F5
1) Addition of descriptive information (description/ name of the film)	X	X	X	X	X
2) Video recording	X	X	X	X	X
3) Addition from own recording/cut	X	X	X	X	X
4) Video acceleration/deceleration	X				
5) Addition of a suitable music (background music) if applies	X	X		X	
6) Adjustment of the volume o the music (turning on/turning down)	X				
7) Cutting parts from previously recorded films					

Suitability for Learner Objectives and Child Development

As can be seen from Table 3 that pre-service teachers have primarily preferred learning objectives and indicators towards self-care skills. In addition to this, it has been detected that they had determined the learning objectives and indicators from social and emotional development, linguistic development, and motor development.

Table 3
Development Fields/ Learning Objectives Fields selected for the Varieties of Representation

	Development Field/Learning Objectives Indicators	The Varieties of Representation
F1	*Social and Emotional Development* Learning Objective 10. He fulfills the requirements *Indicators*: He shows that he is willing to take responsibility. He fulfills the responsibility that he has taken When the responsibilities are not fulfilled, He tells the possible outcomes. *Self-Care Skills* Learning Objectives /: He protects himself from dangers and accidents. *Indicators*: He calls for help in case of any danger or accident.	Explanation Demonstration Exampling
F2	*Linguistic Development* Learning Objective 1. He distinguishes the sounds. *Indicators***:** He tells the direction where the sound comes from. He tells the source of sound *Social and Emotional Development* Learning Objective 1. *Indicators:* He tells his name, and surname Learning Objective 2. He recognizes the properties regarding his family. *Indicators:* He tells the name, and surnames of his parents and home address.	-
F3	*Motor Development* Learning Objective 3. He does the movements requiring object controlling. *Indicators:* He catches the ball thrown. He hits the ball standing idle by his foot. *Self-Care Skills* Learning Objective 8. He takes precautions regarding his health. *Indicators:* He tells what to do for protecting her health. He explains the results that can happen if he doesn't take care of his health.	Explanation Play

F4	*Social and Emotional Development* Learning Objective 12. He follows the rules in different environment. *Indicators:* He acts according to the rules in case of a conflict between them. He follows the rules for politeness. *Self-Care Skills* Learning Objective 1. Applies the cleaning rules regarding his body. *Indicators:* He brushes his teeth; he washes his hands and face. Learning Objective 2. He does works regarding to get dressed. *Indicators:* He takes off his clothes, shoes, he puts on, He buttons/unbuttons, and he ties/unties laces of his shoes.	Explanation Music
F5	*Motor Development* Learning Objective 2. He performs Balance movements. *Indicators:* he stands on one foot. He jumps on one foot. *Self-Care Skills* Learning Objective 6. He uses the necessary equipments for daily living skills. *Indicators:* He uses the right equipment during nutrition. He uses the materials regarding the body cleaning.	Demonstration

When F1 is analyzed, for "He fulfills his responsibilities" learning objective and the indicator of "He shows that he is willing to take the responsibility. He fulfills the responsibility that he has taken. When the responsibilities are not fulfilled, He tells the possible outcomes" it can be seen that a content related with garbage topic has been prepared. In the same film, for "He protects himself from danger and accidents" learning objectives and indicator of "He calls for help in case of any danger or accident"; pre-service teachers have written a script on falling of a child from a slide. However, when film was examined, as soon as the child fell, his mother went for help even if the child had not asked any help. Therefore, it was determined that, the script was not suitable for this aimed objective. When F2 was analyzed, for "He distinguishes sound" learning objective, and indicator of "He tells where the sound comes from. He tells the source of sound", pre-service teachers prepared a script they had used "dog sound", in it, and after the dog was lost, a dog sound was heard and *as saying "O, the sound comes from this way, let's go..."*(F2) , it can be concluded that the objective of "He tells where the sound comes from" was reached. In another film, the learning objective of "He takes precautions regarding for his health", and the indicator of He tells what to do for protecting her health. He explains the results that can happen if he doesn't take care of his health", the pre-service teachers scripted a child's who does not have breakfast getting sick. In film, *he warns his friends saying "if you go out without having breakfast you get sick"* (F3) so it can be concluded that they try to reach to the learning objectives. When F5 was examined, for the

objective of "He uses the necessary equipments for daily living skills" and for the indicator of "He uses the right equipment during nutrition. He uses the materials regarding the body cleaning", the pre-service teachers scripting a child combing his hair with a comb in his hand.

It was observed that the pre-service teachers benefits from different topic, concept and contents to reach to the learning objectives regarding the development fields. Since the topic of garbage that the pre-service teachers has preferred as being associated with the concept of environment in which that children are closely involved, them using of the creatures (dog) that children closely know for the topic of sound, and them using tools that are commonly used in daily life such as brushing teeth and combing hair regarding self-care skills, it can be concluded that the pre-service teachers has preferred the suitable content to reach to the learning objectives. In studies performed, it was determined that the teachers use the computers most to support the activities that present in their daily plans, and most of the teachers did reach the goals that they have set for earlier in the activities in which the computers are being used (Yurt & Cevher-Kalburan, 2011). In this direction, the use of computer during the activities is very significant since it gets children's attention and gives them opportunity for active learning, supports their personal learning, and provides them to make a progress according to their personal knowledge level (Haugland & Shade, 1994).

The Varieties of Representation

When the short films in Table 3 were examined, it was determined that the pre-service teachers have preferred to use the varieties of representation such as explanation, demonstration, exampling, play, and music. When F1 out of short films was examined, it can be seen that the pre-service teacher have used the concept of garbage, based on the topic of environment, and have scripted this concept by using the teaching activities such as illustration, verbal expressions, and associating with daily life. There is a quotation from a talk between a child that has gone to a playground with his mother, and his friends in F1 script below.

> *"Child: Look Mom, they threw their garbage out.*
> *Mother: Yes my girl, let's go and tell them that they have made a mistake.*
> *Child: Hello! Guys. Hello. But why do you throw your garbage out?*
> *Friends: Because the garbage bin is too far from here. It's none of your business, I throw out.*

> *Child: but the garbage bin is there, not too far away. If you keep doing this, our world gets dirtier so we cannot live there anymore.*
>
> *Friends: You are right. Let's put our garbage into the garbage bin"* (F1)

In addition, from the talk in which the pre-service teachers have made explanations regarding the tools as they use a slide in the film *"Let's slide down the slide, OK? OK. Just sit now. Hold from the sides well. If we slide this way, you wouldn't fell down, OK?* It was seen from the (F1) expression.

When F3 was examined, it was determined that the pre-service teachers have preferred illustration, verbal expressions and playing game activities to support these expressions by using the ball.

When F4 was examined, it was determined that the pre-service teachers have scripted in short film that a child brushes his teeth in accompany of verbal music, and used the teaching by music activity in this direction. There are lyrics of the song used in the film below.

> *"Brush your teeth, I brush my teeth after I finish my meals, I brush my teeth before getting to bed, all my teeth are as white as snow, I take good care of them, I certainly brush them at least twice a day, to the right, and to the left, shake it, up and down gargle ... You do brush them (Child brushes his teeth in a way that was in the song).* (F4)

When F5 was examined, it was determined that the pre-service teachers have scripted in a film that two families are having dinner in a kitchen, and used the activities of being a model, and illustrating-asking them to make. There are sample expressions for the activities of being a model and illustration-asking them to make, given below.

> *"Mother: Gülsüm, let's show you friend how to hold a spoon and a fork.*
>
> *Child: Look, like this (Child shows his friend how to hold a spoon and a fork as being a model). Friend: I will show you how to hold a glass, then. Look, like this".* (F5)
>
> *"Look, you can stand on your one foot like this, let's try it.* (F5)

In the study, it's seen that the pre-service teachers have preferred to use the activities of teaching by music and play in short films beside the categories of explanation, demonstration and exampling that determined by Shulman (1986). Musical activities such as joining the musical games, performing imitations compatible with the lyrics of the songs within the scope of teaching by music, which is one of the method that can be used in early childhood period,

has a significant place in education program. And computer also presents interesting sources for children in their music experiences. Visual and audio symbols that will be present in short films, high-quality music, sounds of music and communication provides opportunities for learning by music for the children. In the light of this knowledge, Yurt and Cevher-Kalburan (2011) determined in their study that teachers use the computer most in musical activities. Similarly, play method that influences the mental, physical, emotional and social development of a child in a great extent is one of the methods that are commonly used in early childhood period.

Knowledge of Learner

When the short films that pre-service teachers have prepared were examined in terms of pre conceptions of children and learning disabilities, it was determined that pre-service teachers have not used any emphasis or expressions regarding the detection for pre-conceptions and learning disabilities of the children for the learning objectives and indicators.

However, as a result of the studies performed, it was determined that even if the pre-service teachers have preferred the different learning objectives and indicators from different development fields, they generally use the playground and people from child's close vicinity (family and friends of a child) as a character. It can be said that, based on a thought that the most important need for early childhood period children is playing game, and the main characteristics of early childhood education program is play-basis, relativity principle; When the necessity of the providing the teaching to child first from his close vicinity are taken into consideration, proximodastal principle; since the fact that the selection of playgrounds as a places in which the event took place in short films results in minimum cost and affordable, economy principle was taken into consideration.

Conclusion and Suggestions

In this study, it has been aimed that the examination of technical and pedagogical properties of scripts of the early childhood pre-service teachers in short film designs. In this direction, it was seen that the pre-service teacher have used the knowledge and stimulant content

techniques in pedagogical gamification applications as well as technical skills such as effects, music, sound addition, acceleration.

It was determined in short film that the pre-service teachers have usually used the suitable contents for reaching the learning objectives indicators and development fields. The selection of playgrounds and people from child's close vicinity (family and friends of a child) as characters in scripts by pre-service teachers showed that they are aware of the influence of the close vicinity in learning of early childhood period children. While this is an indicator that the pre-service teachers would have the knowledge of the student which is one of the components of PCK, it doesn't directly give the information. In prospective studies, besides the pre-service teachers' scripts for determining the knowledge of the student, lesson plans, and the curriculum would be used and included into the research.

It was seen that the pre-service teachers have often included illustration and verbal expressions in short films. In addition to this, arising of the categories such as teaching by play and music beside the categories theoretically available in terms of the varieties of representation, remarks for music and play methods that would be used effectively in learning of the children in early childhood period. Simulation, visualization, exampling, explanation, and demonstration categories determined by Shulman (1986) were usually seen in studies of science education. Different varieties of representation categories in addition to teaching by music and play may arise with prospective studies regarding the early childhood education.

In this study, technological pedagogical properties were tried to be determined through short films. In other studies to be made, these properties would also be determined through different techniques used within the scope of TTMD course. In the light of results, the contents of the criteria in technological pedagogical study would be examined in detail for the utilizing the short film designs scripted, or new criteria team would be developed in addition to current studies taking into account the different knowledge components of the technological and pedagogical contents.

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Research Article

A blended Mentoring Practice for Designing E-Material for English as a Foreign Language Learning

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Abstract

Learning a new language is a rigorous process for which the language teachers strive to get learners engaged and for sure, instructional technology can help them to find interesting and creative ways. This study aims to reach suggestions for more effective blended mentoring practices by sharing the results of those practices in teacher education. In this paper, a set of e-materials for pre-intermediate English learners at Foreign Languages School of Ege University is developed. In this collaborative study which is a blended mentoring practice, two Information and Communication Technology (ICT) experts are in charge as coordinators with 46 preservice ICT teachers as mentees and five İnstructors of Englishs as mentors. Mentoring process includes planning, practice and evaluation steps. During fall semester of 2015-2016 academic year, all practices took place in Material Design and Use in Education course of Computer Education and Instructional Technology Program at Faculty of Education, Ege University. At the end of this short period, formal mentoring practice, views of English mentors and mentees on blended mentoring practices are collected electronically via questionnaires. In this case

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study, document analysis is performed. For data analysis, descriptive and content analysis techniques are made use of. Prominent findings includes that preservice ICT teachers perceive English mentors as team-mates who help and guide them and also as content experts in professional sense. Blended mentoring practice is welcomed warmly by both mentors and mentees in general and the results are encouraging for those who wish to conduct interdisciplinary, blended learning based studies in teacher education. Blended mentoring which is considered to have reached its goal by strengthening mentor-mentee interaction is suggested to become widespread in teacher education.

Keywords: *E-mentoring, blended mentoring, e-mentorship in teacher training, EFL; e-material development*

Introduction

Sociocultural theory of development suggests that social interaction plays a fundamental role in the learning process. Within the zone of proximal development concept, Vygotsky states that children form or construct their knowledge in relation to their social interactions with adults or peers who are superior to them in terms of knowledge and experience (Yurdakul, 2015). In this respect, mentoring is described as a more experienced and skillful person's helping a less experienced and skillful person, both personally and professionally with the role of a teacher, instructor and supervisor (Bradbury & Koballa, 2008; Gormley, 2008; Anderson & Shannon, 1998). In the mentoring process, the person who is a beginner, lacks sufficient knowledge and experience, needs guidance and is consigned to a mentor is called mentee (Gu & Day, 2012; Hudson, 2016; Özdemir, 1997).

In a mentoring process mentors should be open to share knowledge, skills and experiences with mentees, and they should be the ones who psychologically support and motivate mentees when necessary. Besides, they are expected to check mentees' performance, comment on their positive and negative sides, offer advice about opportunities and threats, be accessible to their mentees easily and can be asked about any issue, make a good role model when necessary. What is more, it is mentioned that mentors should be the ones who direct mentees according to their abilities and talents (Kuzu, Kahraman & Odabaşı, 2012). It is also stated that a good mentor has qualities such as being mutual, honest, supportive, understanding, related, helpful, principled, respectful, informative, open and willing to authorize, supporting collaboration (Kılınç & Alparslan, 2014).

Thanks to the technological advances, communication between mentors and mentees is not limited to geographical regions. In this respect, the type of mentoring in which mentors interacting mentees on the Internet is specified as electronic mentoring, e-mentoring, telementoring, cybermentoring or virtual mentoring (Brescia, 2002; Kocabaş & Yirci, 2011; Knouse, 2001; O'Neil & Gomez 1996; Single & Muller, 1999). By using the internet, e-mails and online discussion groups, young people who need mentoring overcome time and place obstacles and can get e-mentor support (Hasselbring & Glaser, 2000). For example; when communicating by email, people are freed from the pressure of instant answer, and have the

opportunity to write considering the messages more closely (Single & Muller, 1999). In the globalized world, e-mentoring is also seen as a solution for managers and teachers who have to work away from their cities or countries (Bakioğlu & Göğüş, 2010). For the ones who have to work away from the city or country they live in, e-mentoring helps to reduce stress as a psychosocial support, to socialize, and it provides a support for personal evolution and intercultural education (Wood, 2007). In addition to these, among the other characteristics of e-mentoring, there are its advantages such as taking place instantly, having more application opportunities, personilizing, providing opportunity to share knowledge and experience synchronously and asynchronously (YTÜ-KM, 2016).

Despite all these advantages of e-mentoring, some difficulties are also encountered. Especially in e-mentoring relationships which hold virtual relations developed by a weak faith, lots of misunderstandings occur. Using computer technologies in the process requires computer literacy; and another thing is that technological problems may appear. In addition, in environments where e-mentoring takes place, meeting of people who don't know each other makes it difficult to develop a mutual relation between the mentor and the mentee (Wood, 2007). In opposition to such communication problems appearing in e-mentoring practices which completely take place in electronic environments, it is considered that blended mentoring practices which have face to face communication element can make the process more effective.

Within the framework of electronic mentoring (e-mentoring) which is described as mentoring process carried out via electronic devices, mentoring practices where mentor and mentee communicating not only electronically but also face to face are called blended mentoring or hybrid mentoring practices. As an example for blended mentoring, or shortly b-mentoring, Murphy (2011) carried out a study with the students and graduates of business administration by emails and telephone as well as face to face meetings. According to this study, blended mentoring made positive contributions to both mentors and mentees. It is stated that in this way, mentors became more content due to having the opportunity to do more consultancy, mentees were able to get more support in both professional and psychosocial terms, they better planned their carreer path and they wanted to carry on their relations with their mentors.

In the literature related to e-mentoring and b-mentoring, a lot more positive effects than negative effects are reported. Among the positive features of e-mentoring, its eliminating

logistic barriers between mentors and mentees (Thompson et al., 2010) and mentors' supporting mentees by transferring their experiences and improving their communication skills (Arkün Kocadere & Kızılkaya Cumaoğlu, 2015; Lamb & Aldous, 2012) are mentioned. In addition to this, it is noticed that in Turkey provincial education inspectors and assistant inspectors' professional success increased (Özdemir & Özan, 2013); and professional support and guidance, inspector and investigator, leader, consultant and researcher roles were described (Kılınç & Alparslan, 2014). The negative aspects of e-mentoring are listed as technical problems, difficulties in providing access to computers and not satisfying personal choices (Cothran et al., 2009). On the contrary, b-mentoring practices, in which e-mentoring is supported by face to face communication, mentors who have a chance to supervise more are more content, getting more support both in professional and psychological terms mentees plan their careers in a better way (Murphy, 2011). Furthermore, b-mentoring practices bring solutions for communication problems, which are defined among the limitations of e-mentoring (Thompson et al., 2010).

As seen in the literature, with b-mentoring model communications become more effective, sharing knowledge and experience can be carried out more flexibly and efficiently. Besides, in Turkey the lack of e-mentoring and b-mentoring practices in which student teachers take part points out a gap in the literature about the effectiveness of b-mentoring process in the views of mentors and mentees. In this respect, in a b-learning setting where the strengths of both face to face and online environment are used, making use of b-mentoring in developing student teachers' knowledge and skills with the faculty member and content experts is the starting point of this study. Although it has some inspiration from the work of Arkün Kocadere and Kızılkaya Cumaoğlu (2015) who carried out an e-mentoring practice with CT student teachers, this study, which brings instructors of English and CT student teachers together in terms of b-mentoring practice, brings contribution to the literature as it is a practice of b-mentoring model in teacher education.

This study describes the views of CT student teachers about their getting support from their mentors who are instructors of English, in the process of their designing e-materials for English as a foreign language learning and the views of the mentors about this b-mentoring process. The purpose of the study is to reach suggestions for making b-mentoring practice processes better, planning and disseminating successful practices, by sharing the results of a b-mentoring

practice carried out in teacher education. Apart form this, it is considered that this study will also present the expectations from b-mentors and provide an example for the further studies on this topic.

The subgoals of the study are as follows:

1. What are the qualities of the b-mentors according to the views of the mentees?
2. What are the views of the mentees about the b-mentoring practice?
3. What are the views of the mentors about the b-mentoring practice?

Methodology

This study which is designed as a case study, like Stake mentioned in his responsive evaluation model, it was tried to present the participants' different points of view about the state which was being inquired. The purpose of case study is to analyse a single case or more cases, a participant or a document set within their limits (Bogdan & Biklen, 2007; Yıldırım & Şimşek, 2008). In this study designed as a holistic single case, the practice of b-mentoring which took place makes up the case; the qualities of the mentors, the views of the mentors and mentees about the b-mentoring process are dealt as the elements of the case. The mentoring process is given in detail below in planning, acting and evaluation phases. With this purpose, at the end of the b-mentoring practice the views of both CT student teachers and instructors of English are taken, using the forms prepared by the researchers, which include both open-ended and closed-ended questions. In this respect, the data set of the study is the documents which are based on the statements of the mentors and the mentees. For case studies, as multidimensional data collection (interviews, observations, document analysis) is suggested ideally (Yıldırım & Şimşek, 2008), the data source of this study depending on the statements of the participants is seen as the limitation of the research.

Participants

In this study which was carried out with the coordination of two CT experts, chosen by purposeful sampling method five instructors of English as mentors and 46 CT student teachers as mentees took part in the workgroup. Among the mentees, all of which are females, Mentor-

1 has 17 years of working experience in the institution. Mentor-2 who has a 23 years of experience has participated in different scientific projects before. Mentor-3 has 6 years, Mentor-4 has 18 years, Mentor-5 has 16 years of working experience. According to this, the avarage work experience of the mentors in the institution is 16 years. All mentors have computer and internet access. Three of the mentors are hesitant about their computer competency, one of them feels incompetent and one states that she is competent. All of them are interested in integrating technology in English teaching and they want to improve themselves in this subject. The mentors, who had no experience as a mentor before but want to improve themselves about technology, and the mentees, who want to improve their knowledge and skills in English, stated that they were willing and volunteering to participate in this study. The mentees in the workgroup, or the student teachers are 32 male and 14 female second year students who continue their education in Ege University, Faculty of Education, Department of Computer and Instructional Technology Education. All the students except one had computer access and except four students, all of them had internet access.

E-mentoring Process

In this short-term formal mentoring process, depending on structured e-mentoring model (Single & Single, 2005), planning, acting and evaluation steps were followed.

Planning phase

It was decided that the study would be carried out during the Fall Semestre of 2015-2016 academic year, in Material Design and Use in Education course of Computer Education and Instructional Technology Program at Faculty of Education. In the theoretical part of this course, it is aimed that sudents will gain the basic knowledge and skills about the importance and reasons of using technology and materials in education, the choice of teaching materials, principles of visual design, visual, audial and audio-visual aids used in education, the place and importance of the internet and communication technologies in distant education practices (EU-EBYS, 2016). In the practical part of the course, CT student teachers design different types of teaching materials according to the principles of visual design by working in cooperative groups. In this study, related to the goals of the course, it was aimed to produce digital English class materials by encouraging instructors of English to use communication technologies and

improve ICT student teachers' knowledge of English. With this respect, it was decided that CT student teachers would be mentees and instructors of English would be mentors.

In the study, practice of blended mentoring was planned to enable mentors and mentees work more efficiently by increasing their communication and interaction. In these terms, supporting information share and carring out the interactions on a standard platform via online social network Edmodo as well as weekly face to face meetings were foreseen. As Kuzu, Kahraman and Odabaşı (2012) state, in e-mentoring process, online platforms which can be arranged as common areas, mentor area and mentee area, can bring mentors, mentees, and if there are, coordinators together. In this study, on Edmodo, a shared virtual environment for mentors and mentees being together in the class and a different shared virtual environment for mentors and coordinators were created. Edmodo had been used by the ICT mentors and student teachers before, but mentors of English had never used it. Therefore, the mentors of English were informed about how to use Edmodo by the ICT mentors. Besides this platform, the mentors of English and mentees made a schedule together to meet face to face in the consultancy hours, and the ICT mentors and mentees planned to meet face to face in their weekly classes.

Acting phase

In the acting phase, with their mentors of English, ICT student teachers designed e-materials in types of animation, interactive visual and educational video for pre-intermediate English prep class students. Student teachers worked in small groups. There were 12 groups and each group had one mentor. Each mentor did consultancy for two or three groups. During this 14-week work, the instructors of English mentored the student teachers to create the content, write the scenarios in the educational videos and pronounce the words through both online and face to face meetings.

Evaluation phase

The findings about whether this practice reached its goal or not, were tried to be determined in accordance with the views of the participants as to present the different view points of individuals as Stake suggests (Fitzpatrick, Sanders & Worthen, 2004). The evaluation data was collected via mentor and mentee questionaires created for this purpose.

Data Collection Tools

The data collection tools, which were finalized by getting three ICT experts' views, are as follows:

ICT student teacher questionaire

In this form created by the researchers, there are 11 questions, including personal information, open-ended and yes/no type of questions. Among these questions, as well as personal questions asking students about their computer and internet access, there are three-point type of questions as, 'Please rate the contribution of your mentor in your material development work' and open-ended questions such as 'State the contributions of your mentor to your work'.

Mentor of English questionnaire

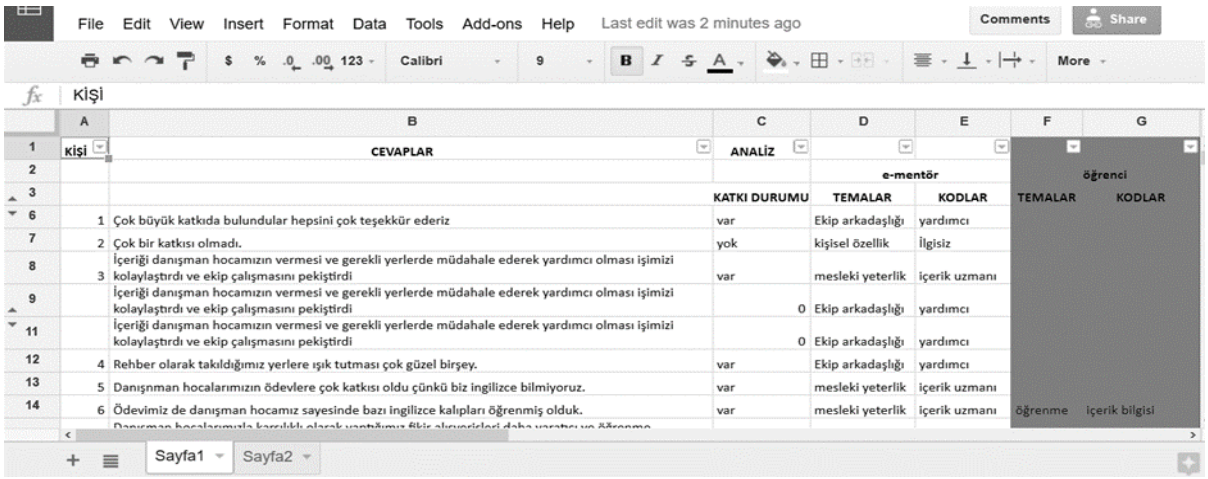
In this form created by the researchers, there are 10 questions including personal information, open-ended and yes/no type of questions. Among these questions, as well as asking the mentors personal questions about their computer and internet access, there are three-point type of questions such as 'How do you evaluate working with the mentees as being their mentors?' and open-ended type of questions like 'State your contributions to this collaborative work in Material Design and Use in Education course.'

Data Analysis

The data set of the study consists of documents. The data, which was collected electronically, was stored in two sepearate electronic files. According to this arrangement, the data set consists of 22 pages; 17 pages of which include the data collected by the student teacher questionaire and five pages of which include the data collected by the mentor questionaire. According to Yıldırım and Şimşek (2013), document analysis is analysing the written materials which include the information about the subject or phenomenon being researched. Two researchers analysed the qualitative data by following the description, analysis and interpretation phases. The whole data set was read by the researchers three times and a data analysis plan was prepared after reading the necessary parts many times. As Yurdakul (2008) states, in this process with an

inductive approach, preparation, coding of the qualitative data, reaching the themes, organising the data, interpretation of the qualitative findings and reporting took place.

As Yıldırım and Şimşek (2008) suggest, researchers created a system where data can be organized by thematic coding and in this sense they used an electronic spreadsheet programme. As seen in Figure 1, in the data analysis and reporting processes researchers had the chance to work together on a shared platform using cloud computing system. In the final phase, the data used in this system was defined according to some specific phenomena and presented in an understantable language for the readers.



	A	B	C	D	E	F	G
1	KİŞİ	CEVAPLAR	ANALİZ				
2				e-mentör		öğrenci	
3			KATKI DURUMU	TEMALAR	KODLAR	TEMALAR	KODLAR
6	1	Çok büyük katkıda bulundular hepsini çok teşekkür ederiz	var	Ekip arkadaşlığı	yardımcı		
7	2	Çok bir katkısı olmadı.	yok	kişisel özellik	İlgisiz		
8	3	İçeriği danışman hocamızın vermesi ve gerekli yerlerde müdahale ederek yardımcı olması işimizi kolaylaştırdı ve ekip çalışmasını pekiştirdi	var	mesleki yeterlik	içerik uzmanı		
9		İçeriği danışman hocamızın vermesi ve gerekli yerlerde müdahale ederek yardımcı olması işimizi kolaylaştırdı ve ekip çalışmasını pekiştirdi	0	Ekip arkadaşlığı	yardımcı		
11		İçeriği danışman hocamızın vermesi ve gerekli yerlerde müdahale ederek yardımcı olması işimizi kolaylaştırdı ve ekip çalışmasını pekiştirdi	0	Ekip arkadaşlığı	yardımcı		
12	4	Rehber olarak takıldığımız yerlere ışık tutması çok güzel birşey.	var	Ekip arkadaşlığı	yardımcı		
13	5	Danışnman hocalarımızın ödevlere çok katkısı oldu çünkü biz ingilizce bilmiyoruz.	var	mesleki yeterlik	içerik uzmanı		
14	6	Ödevimiz de danışman hocamız sayesinde bazı ingilizce kalıpları öğrenmiş olduk.	var	mesleki yeterlik	içerik uzmanı	öğrenme	içerik bilgisi

Figure 1. A sample from the electronic table showing data analysis

Cautions for Validity and Reliability

Researhers need to use extra methods (triangulation, participant confirmation, colleague confirmation) in the validation of the data and the results they reach in order to draw a holistic picture (Yıldırım & Şimşek, 2008). Cautions taken for validity and reliability of qualitative research are as follows: explaining how the results were reached in a detailed report, describing the roles of the researchers, reflecting different points of view and the data being coded by also another researcher. The whole data set was analysed again by a second coder who is an expert in curriculum. The researcher reported the findings by after reviewing the whole data analysis with the second coder. In terms of research ethics participants' individual rights were protected by taking precautions, such as stating the aims of the research in written and oral forms, keeping the personal information and data collected private.

Researchers' Roles

The researchers who took part in the research were two ICT lecturers, one MA student and an instructor. One of the lecturers acted as the lecturer of the course, coordinator of the research and the second coder in the data analysis; the MA sudent acted as an assistant in the acting and reporting phases and the instructor participated as a facilitator by mentoring the other instructors. The lecturer with 13 years of experience in the field has been lecturing in the Material Design and Use in Education course for nine years and has had five years of experience in managing virtual classrooms via Edmodo.

The findings of the study of the research include the views of ICT student teachers about the qualities of their b-mentors and also the views of both the ICT lecturers and the instructors of English about the b-mentoring practice, in accordance with the subgoals of the study.

Views of Mentees about the Qualities of Mentors

37 (80.4%) student teachers who participated in the study state that b-mentoring process contributed to their material development work, whereas four student teachers stated it didn't bring any contribution. Five student teachers made no remark on this. Sudent mentors described the qualities of the mentors. The themes and categories revealed in the data analysis can be seen in Table 1.

Table 1.
Themes and categories revealed in data analysis

Theme	Categories	*f*
1. Co-worker	● Facilitator	14
	● Guide	11
	● Collaborative	4
	● Advisor	3
2. Professional competency	● Content expert	17
	● Teaching skills	5
3. Personal characteristics	● Open to communication	5
	● Interested	4
	● Uninterested	4

Table 1 shows that the student teachers described the b-mentoring qualities of the mentors in three main themes and nine categories. It can be identified that the most uttered categories are content expert, facilitator and guide, respectively.

The theme of co-worker quality is examined under the subcategories of facilitator, guide, advisor and collaborative. Student teachers mentioned that the mentors acted as facilitators in the following statements:

> *'Our mentor contributed a lot to our assignment. She helped with a lot of things.*' (Student Questionnaire -16)
>
> '*We did almost 80% percent of it (the work) thanks to our teachers.*'
>
> (Student Questionnaire-23)
>
> '*They completed the missing parts we had in the materials we created*.'
>
> *(Student Questionnaire -25)*
>
> *'Thanks to our mentor teachers, they put almost the same amount of effort as we did, sometimes even more than we did.'* (Student Questionnaire-31)

Another mentor quality that the student teachers reflected is mentors' acting as a guide. The views on this quality are exemplified as '*They guided (us) to make the topic understood and this was quite successful*' (Student Questionnaire-20) and '*She directed and guided us on all of the materials we prepared…*' (Student Questionnaire-26).

Another mentor quality that the student teachers emphasized is identified as colaborating. The expressions '*We worked together coherently*.' (Student Questionnaire-16) and '*Our teacher made great contributions to our work as we interacted each other*.' (Student Questionnaire-26) support this view. The advisor quality of the mentors is expressed in '*I think sharing ideas with our mentors helped us a lot to be creative and to produce long lasting materials for learning.*'(Student Questionnaire-7) and '*She also helped us with the content and the idea.*' (Student Questionnaire-17). So student teachers described the mentors as coworking, facilitating, guiding, and also advising and collaborating individuals. They emphasize the mentors' facilitating and guiding qualities.

Among the mentors' qualities, the theme of professional competence is explained in categories of content expert and teaching skill. Student teachers stated that the mentors helped them with the preparation of the content:

'*For the English part, having a teacher to ask directly and learn accelerated the process*.' (Student Questionnaire-8)

'*Eventually we don't have full command over English, so she helped a lot to prepare the content*.' (Student Questionnaire-12)

'*Although she was very busy, she tried to do her best to send us the content needed for the materaials as soon as possible'*. (Student Questionnaire-24)

'*She provided all the things that would be useful for us, such as the place we would use, materials*.' (Student Questionnaire-38)

Besides this, it is also clear that the mentors supported the mentees in terms of teaching by sharing their experiences. The student teachers expressed, '*We obtained useful materials benefitting from their teaching experiences.'* (Student Questionnaire-26) and '*The explanatory answers she gave in the necessary parts helped (us) to progress in the topic*.' (Student Questionnaire-36). It is seen that student mentors are so much in need for their mentors' expertise in the content knowledge and they rely on them. They also want to be supported by their mentors in terms of professional development and they want them to be professionally competent.

Another mentor quality is given in categories of open to communication, interested and uninterested, under the theme of personal characteristics. Student mentors didn't express much about the personal characteristics of mentors. They expressed their positive and negative views depending on the interaction they had during the process. About mentors' being open to communication, they stated the following:

'*Our dialogue with our teacher was very good*.' (Student Questionnaire-21)

'*She made us feel relaxed when we were with her and she treated us very mutually.*' (Student Questionnaire-24)

'*By responding our questions right away, she avoided possible delays related tocommunication*.' (Student Questionnaire-30)

As another positive quality, the student teachers stated that their mentors were interested. They expressed, '*As she was interested and friendly, we could easily ask questions when we got stuck.*'

(Student Questionnaire-24), '*They put a lot more effort than we did and they made the process enjoyable*.' and '*they showed a lot of interest*'. (Student Questionnaire-32)

Apart from these positive qualities, there are views (f=4) which reveal that the mentors were uninterested. 'She didn't contribute much.' (Student Questionnaire-2) and 'I think we could do it by ourselves and actually it was like that most of the time.' (Student Questionnaire-41) are examples for the views that reveal b-mentoring process didn't make any contributions to the material development work. According to this, student teachers evaluated the personal characteristics of the mentors in terms of their contribution to their work. The attitudes of the mentors during the process were expressed as whether they were open to communication and interested or not.

Mentees' views about the b-mentoring process

In addition to their views about the mentor qualities, the student teachers also reviewed the contributions of the b-mentoring process. These contributions are given in facilitating (f=9), cooperation (f=6), learning (f=6) and professional development (f=3) themes. The related examples are as follows:

> '*They made our work easier as they suggested projects*.' (facilitating) (Student Questionnaire-27)
>
> '*We had the joy of producing as a group and my group awareness increased*.' (Student Questionnaire-10)
>
> '*It was very good for us to improve our English*.' (Student Questionnaire-16)
>
> '*I think sharing ideas with our mentors helped us a lot to be creative and to produce long lasting materials for learning.*'(Student Questionnaire-7)

With these views it is noticed that student teachers benefited from the process and they gained some experiences while working in collaboration. It is noticed that the mentors, who have an average of 16 years of working experience, were able to transfer knowledge to support the student teachers' professional development and facilitate their work through the b-mentoring process.

Mentors' views about b-mentoring process

Mentors, who are the instructors of English, expressed positive views (f=4) about the b-mentoring practice carried out with the ICT student teachers. Only one mentor stated she was hesitant. In addition to this, all of the mentors stated that they would want to participate and give support to this type study again if it was repeated. Their views about the contributions of this study are as fallows:

> '*It brought action to our everyday teaching routine…as I stated before, we became aware of different types of pc programmes…if possible, I would like us to apply them by ourselves soon*.' (Mentor Questionnaire-1)
>
> '*I got information about new presentation techniques and my awareness increased. I got to know a new student profile. I had the chance to know you and work with you*.' (Mentor Questionnaire-2)
>
> '*I had the chance to learn a couple of teaching platforms*.' (Mentor Questionnaire-1)
>
> '*It was a bit time consuming, although the students took care of the programmes, it took a little more than we had thought…but it was fun…'* (Mentor Questionnaire-4)
>
> *'It provided opportunity to learn about virtual classroom applications and digital material tools.'* (Mentor Questionnaire-5)

In this respect, mentors qualify this process, in which they interacted with the mentees, useful in terms of their own professional development. They stated that they were acknowledged about the idea of producing different applications via new tools. When the views of mentors and mentees are considered together, it is seen that both the mentors and the mentees collaberated during the material development process, the process made positive contributions to their work and they mainly hold positive views of the b-mentoring practice.

Discussion, Conclusion and Suggestions

In this study, which is a blended mentoring practice for designing e-material for English as a foreign language learning, the views of the student teachers in the role of mentee and the views of the instructors of English in the role of mentor about the b-mentoring practice and the contributions of this practice are dealt with. The study reveals that two participant groups mainly hold positive views about the b-mentoring process. The prominent findings show that

according to the student teachers, the mentors are facilitating and guiding as a coworker and supporting in professional terms as they are the experts of the content. In addition, student teachers state that as for their personal characteristics, the mentors are open to communication and interested in the student teachers' work. These qualities are supported by various research findings in the literature (Arkün Kocadere & Kızılkaya Cumaoğlu, 2015; Kılınç & Alparslan, 2014; Özdemir, 2015). In this respect, it is considered that the participant mentors fulfilled their responsibilities in the study.

A significant number of student teachers who took part in the study, expressed that b-mentoring made positive contributions to their work. Besides, almost all the mentors expressed their satisfaction with the b-mentoring practice. These findings support both the finding of Lamb and Aldous (2012), which reveals that b-mentoring practice has positive effects as mentors transfer their experiences to mentees and Murphy's (2011) finding which shows positive contributions of b-mentoring to mentors and mentees. Also, like in the study carried out by Thompson and et.al. (2010), in this study all the mentors stated that they would like to participate b-mentoring practices again. Moreover, in this study the problems such as technical problems and mentors' not meeting the expectations, which were encountered in the study of Cothran et. al., weren't detected. In terms of fulfilling their own responsibilities, both the mentors and the mentees reacted positively to a blended model in which both electronic media and face to face meetings were used. As Thompson and et. al. emphasized, blended forms are needed in e-mentoring practices since using just electronic communication is ineffective.

As Arkün Kocadere and Kızılkaya Cumaoğlu (2015) stated, if applied well, especially when mentor-mentee matching is done well, mentoring practice provides contributions to both mentor and mentee's personal and professional development. Although there was no criteria, except for volunteering, to participate in this study and no specific procedure was followed to match the mentors and mentees, in general the findings show mentors and mentees worked together collaboratively.

In conclusion, this practice, which was aimed to create digital learning materials with the help of mentors as the content experts, and was conducted in a collaborative, interdisciplinary, interactive learning environment of b-mentoring process, reached its aim. Therefore; in the light of its findings, the following suggestions are made:

1. In data collection process, more detailed data could be collected by means of interviews and observations as well as questionnaires. In this way, b-mentoring process can be examined thoroughly.
2. In addition to matching collaborative groups with mentors like in this study, one to one b-mentoring practices could be done to carry out effectiveness studies.
3. In this study few problems, such as mentors' not dealing with the mentees were determined. Further research in order to determine and eliminate problems which might affect b-mentoring process negatively should be conducted.
4. Analysing the effects of b-mentoring practices on various variables with the use of not only descriptive but also experimental studies will contribute to literature.
5. Suitable courses in other departments of education could be chosen to conduct studies on b-mentoring practices, and then the results of these studies could be compared.

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