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# PERR 

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## A Qualitative Study on Identifying Problems in North Cyprus Education System


#### Abstract

The purpose of this study is to determine the problems experienced in the North Cyprus education system, to evaluate them in the context of the opinions of the stakeholders (teachers, principals, assistant principals), and to determine the causes and possible solutions to these problems. Qualitative Research Method was utilized in this study. Maximum variation sampling method was used to determine the participants. The study group consisted of 37 people ( 20 teachers, 5 principals and 12 principal assistants) working in secondary schools located in Nicosia, North Cyprus. Semi-structured interview schedules were used as data collection tools. The findings revealed student-based, education-based and teacher-based problems in the education system. Regarding the student-based problems the participants stated that foreign students, whose number has increased in recent years, do not speak Turkish; also, the classes are crowded. For the education and teaching-related problems, teachers stated that they did not have enough time to cover the curriculum and there were insufficient examples in the textbooks. Regarding the teacher-based problems, the lack of inservice trainings, the insufficient number of the counsellors and special education teachers were stated. Participants emphasized the importance of planning, organizing, ordering and supervision so that problems would not arise.


Keywords: Education System, Educational Problems, Student, Teacher, Administrators

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## INTRODUCTION

Today, the goal of all countries is to successfully realize quality in education in their own countries. Achieving quality education is among the goals of the North Cyprus Ministry of Education (MoNE), and this can only be possible by improving the education system. The current study was carried out in order to determine the flaws in the education system and to make suggestions. In addition, it has been thought that these and similar studies can contribute to the MoNE and universities in the North Cyprus in their future education projects.
Many definitions of education have been made in the literature. In the most general sense, education is the process of raising people for certain purposes and must be of certain quality to meet standards, follow new innovations and technologies. (Fidan, 1996; Thangeda, Baratiseng and Mompati, 2016). Education is the totality of the processes in which an individual develops his / her skills, attitudes and other positive behaviours in the society they live in (Tezcan, 1992, 3). Education is the process of gaining knowledge, skills, habits and attitudes to the individual (Önder, 1992, 20). Education is important for all children, but even more so for children with disabilities, whose social and
economic opportunities may be limited. Avon and Loprest (2012) assessed how well the nation's education system is serving students with disabilities. (Avon \& Loprest, 2012)
From an individual point of view, education is the process of changing the behaviour, knowledge, ability and motivation of the staff in order to increase the success of reaching the goals. Education is a management tool that aims to improve the current success of the organization in terms of efficiency and productivity (Yüksel, 1990). Every society experiences the contradiction between the desire to renew the educational system and the tendency to maintain it as it is. The desire to renew the system arises from the pressure of contemporary developments; The tendency to protect the existing is the result of the desire to provide continuity and to give trust. As it is very difficult to resolve this contradiction, education systems change very slowly, although societies change rapidly. Efforts to innovate education often remain in reform projects, plans, not implemented. Contemporary educational discourses are constantly repeated in the literature, but they do not enter school and do not reflect on the life of the student (Onur, 1994).

Figure 1. The General Structure of the Cyprus Turkish Education System


Source: (Department of Educational Planning and Program Development, 2005) (Yaratan \& Kasapoğlu, 2012)

The number of researches on education problems in North Cyprus is limited. Günsel (1994) stated that the society in North Cyprus is in a constant state of change and has experienced wars. Therefore, education system was adversely affected. The second survey related to this subject is the Economic Policy Research Foundation of Turkey (TEPAV, 2012) report. According to the report, the problems of the North Cyprus education system are stated as follows: insufficient data on the immigrant children's attendance at school, insufficient use of information and communication technologies in management services and in the classroom, insufficient facilities such as libraries and laboratories in their institutions, employment of school principals and teachers by the Public Service Commission, and very little authority in terms of management and financing of primary and secondary schools.

Alibaba, Erden \& Ozer (2013) in their study had the aim of verifying the proposed professional teaching standards for teacher development in North Cyprus using Rasch model analysis. In another study, Karahanoğlu (2015) found out that the problems of the North Cyprus education system arouse from school administrators, teachers, parents and students. Problems with school administrators addressed issues such as not improving oneself, not being open to innovations, not being able to use information and communication technologies effectively, and not having communication skills. Also, problems with teachers are issues such as the choice of the profession due to economic concerns, not taking into account the developmental characteristics of students, not being able to improve oneself, experiencing burnout, having communication problems with parents. In the problems related to students, he also addressed the issues of students' lack of motivation, absenteeism of students, negative effects of students by their families and purposelessness. Apart from these, he also stated the problems caused by parents.

In another study, Erden (2014) mentioned the preservice teachers' qualifications of computer use in
education, and the evaluation of the teacher candidate education programs. Erden (2016) emphasized the importance of determining the development process, dimensions of vocational education standards and draft vocational education standards as the first step to propose a national framework for vocational education standards in North Cyprus.

Erden \& Erden (2019), sought the opinions of administrators and teachers working in primary, secondary, general high schools and vocational schools on the problems of the North Cyprus education system. In these studies, private tutoring by teachers, teacher attitudes, low motivation, loss of reputation of the profession, unnecessary reporting, lack of special education and counselling services in primary schools, lack of teachers in schools, inability of teachers to apply contemporary teaching methods, teachers not using tools and equipments in schools.

Karahanoğlu (2015) also mentioned the problems caused by student parents in the North Cyprus education system. It has been observed that problems such as parents 'not taking care of children adequately, not being open to communication and not spending quality time with their children, being far away from cooperating with teachers, and parents' intervention in the teacher's work more than necessary were mentioned.

The problem statement of the study is "What are the problems of the North Cyprus secondary education level from the perspective of the stakeholders? And what suggestions could be made to improve the education system?" In this study, the problems in the North Cyprus secondary school level in education system were examined under the three main themes, which emerged from the findings.

These are:

- Student-based
- Education and teaching-based
- Teacher-based


## METHOD

## RESEARCH MODEL

The study is a qualitative study. In qualitative research studies, the aim is not to generalize, but to obtain a holistic picture. Qualitative research aims to examine the subject matter in depth and detail. (Yıldırım \& Şimşek, 2005)
The study group consists of 37 people. It was conducted in 5 secondary schools in Nicosia region affiliated to the General Secondary Education Department, MoNE. These forms were sent to 5 principals and 12 assistant principals and 20 teachers in schools.

Semi-structured interview schedules were used as data collection tools. The interview questions were sent to the participants by e-mail and the answers were taken back with the same method. The results obtained from the participants were analysed by grouping them under certain headings in the Excel program. (Table 5. and Table 6.)
In this technique, the researchers prepared the interview schedules that included the questions planned to be asked beforehand. While preparing the interview schedules used in the study, in order to establish a more effective and efficient communication with the interviewees, a special care was taken to ensure that the questions were as clear as possible, easy to understand, to provide explanations and detailed answers, and not to be multidimensional in order not to create an unnecessary question burden on the interviewee (Yıldırım \& Şimşek, 2005).

## DATA COLLECTION AND ANALYSIS

The interviews were held in Nicosia, between September and January in the 2019-2020 Academic Year. The opinions of 20 teachers, 12 Assistant Principals and 5 Principals from different schools were sought. For this purpose, the interview schedule that contained 7 questions under 3 headings, was sent to the relevant participants by mail and the answers were also received by mail. A total of 50 pages of data were obtained from the participants in the study. The study is a qualitative study. The "descriptive analysis method was used to analyse the data collected in the study. The data obtained according
to this approach were summarized according to the predetermined themes. The data were analyzed considering the questions used in the interviews and presented in the study group section. The identified problems were presented within the framework of sub-problems (themes).

The maximum variation sampling method from purposeful sampling was used to determine the participants from different gender, age, seniority, subject, education level etc. The purpose of maximum variation sampling is to create a relatively small sample and to maximize the diversity of participants who may be a party to the problem studied in this sample (Yıldırım \& Şimşek, 2005). In this study, demographic information was obtained from the participants as shown in Table 1., Table 2., Table 3. and Table 4. in the study group section.

The problems listed by the stakeholders regarding the education system were analysed descriptively. During the analysis process of the data obtained from the study, the responses of the participants to the interview questions were grouped by the researchers under some certain titles and subthemes. The purpose of this kind of analysis was to present the findings to the reader in an organized and interpreted form (Yıldırım \& Şimşek, 2005).

## VALIDITY

The collected data were transcribed in detail and the results were explained in a clear and understandable way. The answers by the interviewed stakeholders were analysed by grouping them under certain headings in the Excel program Research findings are consistent and meaningful. The emerging concepts are of a nature to form a whole.

The researchers questioned themselves and their research processes with a critical eye; checked whether the findings and the results of these findings reflected the reality. In order to generalize the research results to similar environments, the researcher informed the reader in detail about all the stages of the research. The reader may not be able to generalize directly to his / her environment based on research results; however, s/he can draw some lessons or experiences that may apply to
her/his environment. (Yıldırım \& Şimşek, 2005). The study also provides necessary explanations for the findings to be tested in other studies.

In the study, "semi-structured interview" technique was used as data collection method. Interview questions were sent to 37 participants from different schools in the Nicosia region. The data were transcribed in detail and transferred to the Excel program. The validity check was also made by explaining how the results were reached in a clear and understandable way.

## RELIABILITY

For reliability, the data were kept with an Excel program so that the data could be viewed by anyone. The reliability of the study was calculated using the formula above (Miles \& Huberman, 1994).

> "Reliability $=$ Agreement $/($ Agreement + Disagreement $) \times 100 "$

Some of the questions in the interview form were shown in Table 5. in the findings section. The interview schedule prepared by the researchers was first shown to four field experts, one of whom was curriculum development, one was education management, one was Turkish Language and one was assessment and evaluation. The researchers avoided directing the interviewed participants and tried to make the teachers speak in line with the subject and purpose of the study. The individuals who were the data sources in the research were clearly defined so that other researchers doing similar research can take these definitions into account when creating samples. The data were stored so that they could be reviewed by others (Yıldırım \& Şimşek, 2005).

Later, the researchers reached a consensus by discussing the opinions they determined under different themes. The reliability of the study was calculated using the formula "Reliability $=$ Agreement / (Agreement + Disagreement) x 100" (Miles \& Huberman, 1994). The reliability rate among researchers was found to be $86 \%$. The responses given by the participants were grouped under certain headings and descriptive statistical frequency ( n ) and percentage ( p ) tables and values
were used for the analysis. All tables were shown in the findings section (Table 5. and Table 6.).

## STUDY GROUP

The opinions of 37 participants from different five schools in Nicosia were sought. For this purpose, interview schedules including 7 questions collected under 3 headings were prepared. A section of the questions in the interview schedule was shown in Table 5. According to the answers given by the participants to the interview questions, the findings were grouped under 3 main themes by the researchers. In addition, all demographic information of the participants in the interview form was shown in Table 1. Table 2., Table 3. and Table 4 . in the study group section. Table 1. Distribution of the Participants by Age

| Gender | Age | Frequency (n) | Percentage (p) |
| :---: | :---: | :---: | :---: |
| Female | $<40$ | 9 | 24.32 |
|  | $>40$ | 11 | 29.73 |
| Male | $<40$ | 8 | 21.62 |
|  | $>40$ | 9 | 24.33 |
| Total |  | 37 | 100 |

When Table 1. was examined, it was seen that the majority of 37 people who participated in the interview were women and over 40 years old ( $\mathrm{n}=$ $11 ; \mathrm{p}=30 \%$ ). In the data obtained from the interviews, it was observed that men over 40 years old were in the minority ( $\mathrm{n}=9 ; \mathrm{p}=24 \%$ ). Table 5 shows that women over the age of 40 participated in-service training more than the other woman participants.

Table 2. Distribution of the Participants by Years of Seniority

| Gender | Year of <br> Seniority | Frequency <br> $(\mathrm{n})$ | Percentage <br> $(\mathrm{p})$ |
| :---: | :---: | :---: | :---: |
| Female | $<12$ | 9 | 24.32 |
|  | $>12$ | 11 | 29.73 |
| Male | $<12$ | 10 | 27.03 |
|  | $>12$ | 7 | 18.92 |
| Total |  | 37 | 100 |

When Table 2 was examined, it was seen that among 37 people who participated in the interview, there were more women with a year of seniority over 12 years ( $\mathrm{n}=11 ; \mathrm{p}=30 \%$ ). In the
data obtained from the interviews, it was observed that men with a seniority of over 12 years were in the minority $(\mathrm{n}=7 ; \mathrm{p}=19 \%)$. When we associated this table with the data in Table 5 and Table 4, it was seen that women with a seniority year of over 12 years were Guidance and Psychological counseling and English teachers, and they wanted more in-service training in their fields.

Table 3. Distribution of the Participants by their Education Level

| Gender | Education Level | Frequency (n) | Percentage (p) |
| :---: | :--- | :---: | :---: |
| Female | Degree | 12 | 32.43 |


|  | Master Degree | 6 | 16.21 |
| :---: | :--- | :---: | :---: |
|  | PhD | 3 | 8.11 |
|  | Degree | Master Degree | 40 |
|  |  | 4 | 27.03 |
|  | PhD | 2 | 10.81 |
| Total |  | 37 | 5.41 |

When Table 3 was examined, it was seen that among 37 people who participated in the interview, the education level of women was higher than that of men. It could be said that female teachers spent more effort to increase their education level than male teachers.

Table 4. Distribution of the Participants by their Subjects

| Teacher Subject | Frequency (n) | Percentage (p) |
| :--- | :--- | :--- |
| Information \& Communication Technology | 3 | 15 |
| Guidance \& Psychological Counselling | 5 | 25 |
| Science \& Technology | 2 | 10 |
| Maths | 3 | 15 |
| English | 5 | 25 |
| Turkish | 2 | 10 |
| Total | 20 | 100 |

When Table 4. was examined, it was seen that Guidance and Psychological Counseling teachers out of 20 people who participated in the interview were more than the teachers from other subjects. ( $\mathrm{n}=5 ; \mathrm{p}=25 \%$ ). The least participation in the study was from Turkish and Science Teachers. (n $=2 ; \mathrm{p}=10 \%$ )

## FINDINGS AND COMMENTS

In this study, the researchers tried to determine the problems experienced in the North Cyprus education system through the answers given by the participants. The responses were grouped, divided into 4 main themes and interpreted.

## STUDENT-RELATED PROBLEMS IN THE NORTH CYPRUS EDUCATION SYSTEM

In the responses as shown in Table 5, it can be seen that the biggest responsibility in solving studentrelated problems is in the hands of the Ministry of National Education. In addition, due to the large number of students, teachers cannot allocate sufficient time to students. Another answer given by the participants is that the Ministry should provide necessary trainings for foreign students and their families regarding language and school adaptation problems.

EDUCATION AND TEACHING RELATED PROBLEMS IN THE NORTH CYPRUS EDUCATION SYSTEM

The participants said that The Ministry of National Education has a duty in solving the problems arising from education and training as shown in Table 5. Ministry directors, inspectors and experts
in the Ministry of National Education were required to check the textbooks, curricula and inservice training. The alignment of the curriculum with the textbooks, examples and the deadlines determined for the completion of the topics should be reviewed. The MoNE should impose certain sanctions for teachers' participation in in-service training. School principals and supervisors can provide this.

## PROBLEMS CAUSED BY TEACHERS IN THE NORTH CYPRUS EDUCATION SYSTEM

The participants with regard to the problems caused by teachers (Table 5) said that the teachers were behind the educational-personal progress. They cannot adequately follow the developments in vocational and education and training. Teachers do not take students' developmental characteristics and individual differences into account, and this negatively affects the success.
The participants added that the inspectors should supervise and evaluate the inspected works, make suggestions to make these studies more efficient, help the personnel in the institution through their work and professional development. In our country, the inspection is not carried out because there are still no inspectors in certain subjects. Most of the teachers have not been able to find solutions to problems related to their subjects for
years, as they still do not have supervisors. Teachers from some branches are burdened by the administration. These branches are especially Information and Communication Technologies, Music, History, Painting etc. Due to the insufficient number of counsellors and special education teachers and shorter meeting hours in some schools, these teachers are assigned as assistant principals by the school administrations. Therefore, these teachers devote less time to their students. Table 4 shows the number of participants according to their branches.

## THE PROBLEM THAT NEEDS TO BE SOLVED FIRST IN THE NORTH CYPRUS EDUCATION SYSTEM

In the current study, we asked the participants which of the problems in the education system they would like to be solved first. Most of the participants said that in service training should be increased and be compulsory (Table 6).

Undoubtedly, the school is the institution that will be most and rapidly affected by the changes in the environment. The teacher can never remain indifferent to these changes. The teacher must renew himself/herself, attend the courses and, as a teacher, always be ahead of his students in terms of knowledge.

Table 5. Participants' Responses to the Interview Questions

|  | Interview Questions | Most Given Answers |
| :--- | :--- | :--- |
| 1 | How can you solve the problems that the foreign <br> students face while adapting the school? | "Language and orientation courses should be provided <br> to these students and their families by the ministry or <br> school" (T11) <br> "The MoNE must arrange to give language course for <br> foreign students" (T13) |
| 2. | What do you think about the examples given in <br> textbooks? What can we do to overcome these <br> problems? | "Examples are insufficient" (T9). <br> "Ministry directors, inspectors and experts in the <br> Ministry of National Education (MoNE) were required <br> to check the textbooks, curricula regularly" (T8). |
| 3. | What do you think about the duties that you are <br> assigned by the school administration? | "The school administration gives many additional tasks <br> each year especially to Information and <br> Communication Technology teachers" (T2) <br> "The school administration gave us many school <br> works. It was obvious that most of the school works <br> made by the computer teachers in all school. And we <br> must also attend in-service training This was <br> compulsory to us" (T1) |


|  |  |  |
| :--- | :--- | :--- |
| 4. | What do you think about the in-service training <br> opportunities? | "In service training should be compulsory and exam <br> should be held at the end of each training. For teacher <br> to participate, in these trainings, MoNE should impose <br> sanctions on every teacher." (T6) <br> "The ministry of education should warn and follow that <br> the trainings that will provide in-service trainings <br> should follow technology and plan their education <br> according to developments." (T5) |
| 5. | What can you say about the presence of <br> counsellors and special education teachers in <br> your school? | "In some schools there are not enough counsellor and <br> special education teacher." (T3) <br> "The problems are the school gives additional strikes <br> due to the shortage of teaching hours. It's like assistant <br> manager on assignment. Also we need more service <br> training to improve ourselves" (T4). |

Table 6. Distribution of the Suggestions Given by the Participants

| Suggestions | Frequency (n) | Percentage (p) |
| :--- | :--- | :--- |
| Increasing in service training | 7 | 18.92 |
| Mandatory in service training | 6 | 16.22 |
| Compliance of curriculum textbooks \& course books | 4 | 10.81 |
| Increasing the quality of service training | 4 | 10.81 |
| Reduction of additional duties in some subjects | 3 | 8.11 |
| Turkish language course for foreign students | 3 | 8.11 |
| Increasing the number of counselling and special <br> education teachers | 3 | 8.11 |
| Taking an exam at the end of in service training | 3 | 8.11 |
| Increasing the examples in textbooks | 3 | 8.11 |
| Increasing the number of inspectors | 1 | 2.69 |
| Total | 37 | 100 |

When Table 6 was examined, it was seen that the most desired problem to be solved is inadequate in service training opportunities ( $\mathrm{n}=7 ; \mathrm{p}=18.92 \%$ ). "In (MoNE) the number of in service training and the quality should be increased. "(T12). Some participants said that in-service training should be mandatory ( $\mathrm{n}=6 ; \mathrm{p}=16.22 \%$ ). "In service training should be compulsory and exam should be held at the end of each training." (T6). Participants suggested the harmonization of curriculum-textbooks-course hours and increasing the quality of in-service training ( $n=4 ; p=10.81 \%$ ).
"Ministry directors, inspectors and experts in the Ministry of National Education (MoNE) were required to check the textbooks, curricula regularly." (T8). Some participants suggested the reduction of additional tasks in some subjects, giving Turkish language courses to foreign students, increasing the number of counselling and special education teachers, increasing the examples in textbooks and having exams at the end of the in service trainings ( $\mathrm{n}=3 ; \mathrm{p}=8.11 \%$ ). Also it was observed that the least desired solution was increasing the number of inspectors ( $\mathrm{n}=1 ; \mathrm{p}=$ $2.69 \%$ ).

## CONCLUSION

Education systems with today's needs to transform into a structure that values every person in accordance with new social, political and cultural developments, new skills (Desjardins 2015), teaches ways and methods of accessing information, and observes equal opportunity (Chand and Karre, 2019). An intense effort is being made to reach quality education in North Cyprus. For this purpose, it is aimed to develop a model based on teaching to increase and disseminate the quality in education, disseminating the education programs based on innovation and research throughout the country, encouraging students to scientific research and entrepreneurship, establishing a quality assurance system in educational institutions, determining and disseminating quality standards, increasing the authorities and institutional capacities of educational institutions. In this study, which we conducted in order to share some important findings about the current state of the North Cyprus Education System and to make some suggestions for improvement, it has been revealed that these problems are student-oriented, education-based and teacher-oriented. These results can be summarized as follows:
According to the findings obtained from the interviews, it was seen that the biggest task in solving these problems caused by the students falls to the Ministry of National Education. In addition, teachers cannot allocate sufficient time for each student due to crowded classes.

- North Cyprus MoNE has the biggest share in solving the problems arising from education and training. Inspectors, ministry directors and experts in the relevant subjects are required to regularly check the relevant textbooks, curricula, annual lesson plans and in-service training. In our country, inspection is not carried out in certain subjects because there are still no inspectors. The teachers should definitely renew/update themselves and attend inservice training courses.
- When the education and training based problems are handled, the lesson hours shown in the annual plans and the practice in daily life are not the same. At the end of
the year, most subjects in the curriculum cannot be completed. The reason for this is the inconsistency between the lessons taught and the time allocated for the curriculum, and the textbooks.
- In our country, inspection is not carried out because there are still no inspectors in certain subjects. The needs in this area must be met urgently. In addition, teachers should definitely update themselves in line with the benefits of technology and go to in-service courses.
- The participants stated teacher-related problems that teachers cannot take students' developmental characteristics and individual differences into account and this negatively affects the success. There are not enough counsellors and special education teachers in every school. Moreover, the fact that the school administration sometimes gives additional tasks to the teachers in this subject due to the low number of courses (such as Assistant Manager of Assignment) limits their time and sometimes they cannot provide the students with the necessary attention and care. These need to be checked by the ministry.


## SUGGESTIONS

Depending on the results of the study and the suggestions made by the participants themselves, the following suggestion could be made.

- Foreign students and their families should be provided help in their adaptation to a new culture. They should be given a Turkish language course.
- Teachers should be allowed to improve themselves and their attendance should be checked by the North Cyprus Ministry of Education and necessary in-service training should be provided.
- Guidance and Information and Communication Technology teachers should not be assigned additional duties other than their academic responsibilities.
- All stakeholders have a role in solving the problems in the North Cyprus education system. For this purpose, the Ministry of National Education, administrators,
teachers, parents, students, teachers' unions and all other stakeholders should come together for common purposes and fulfil their duties.
- Educational programs should be reorganized, certain budgets should be allocated to schools to achieve their goals, and if necessary, the learning and teaching process in the entire education system should be radically changed.


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## An Investigation of Adolescents’ Levels of Exposure to Cyberbullying in Terms of Social Media Attitudes and Social Appearance Anxiety


#### Abstract

The aim of this study was to investigate adolescents' levels of exposure to cyberbullying in terms of social media attitudes and social appearance anxiety. To that end, adolescents were reached on online platforms in an attempt. 292 girls and 158 boys ( 450 individuals in total) were included in the research. Ages of the participants ranged between 14 and 18 years, and their mean age was found to be 16.45 years (sd=1.14). Cyberbullying Scale, Social Media Attitude Scale and Social Appearance Scale for Adolescents were utilized for data collection. Pearson's Product-Moment Correlation coefficient was used for correlational analyses while Multiple Hierarchical Regression Analysis method was utilized in the regression analysis. The research results showed significant relationships between scores of cyberbullying, social appearance anxiety, social media attitudes, and subscale scores of social media attitudes. It was concluded with the regression model that social appearance anxiety and subscales of social media attitudes explained cyberbullying by $28 \%$. In light of these results, recommendations were provided about activities that can be conducted on adolescents' social appearance anxiety and social media attitudes.


Keywords: Social media, cyberbullying, social appearance anxiety, adolescence

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## INTRODUCTION

Adolescence is defined as a period between childhood and adulthood which involves cognitive, socio-emotional and biological changes (Santrock, 2012a). Girls enter this period at about 11 years of age and boys at about 13 years of age. Adaptation of adolescents to rapid changes in their bodies is recognized as an important problem for this period (Senemoğlu, 2013). Individuals may have increased levels of concerns about their bodies especially in early adolescence (Santrock, 2012b). Adolescents' evaluations of their own bodies can affect their mental health and cause them to have problems such as social anxiety (Aslan and Koç, 2018). In this process, attraction felt by adolescents about their bodies can play a role in peer relationships, comparison of their bodies, and social appearance anxiety (Davison and McCabe, 2006). Nevertheless, physical attraction has been found positively correlated with academic competency (Lerner et al., 1990), popularity among peers (Boyatzis, Baloff \& Durieux, 1997), anger levels (Borch, Hyde \& Cillessen, 2011; Zwaan, 2010), and self-esteem (Wade, 1991) among adolescents. Adolescents' evaluations of their own bodies can also be effective in their personality development (Dolgin, 2014). When evaluation their own appearances, adolescents can make comparisons with their peers (Jones, 2001) and utilize feedbacks from their peers (Mccabe \& Ricardelli, 2001). Individuals’ own evaluations of their bodies and others' evaluations can lead to social physique anxiety (Hart, Leary \& Rejeski, 1989) and social appearance anxiety (Hart et al., 2008).

Social physique anxiety, a type of social anxiety, was defined as the anxiety experienced by individuals about others' evaluations of their physical appearance (height, weight, muscles) (Hart, Leary \& Rejeski, 1989). In social appearance anxiety, concepts such as facial structure, dimensions and skin color were included besides physical appearance (Hart et al., 2008). Adolescence can be a risky period for social appearance anxiety (Alemdağ, Alemdağ \& Özkara, 2016). It has been observed that social appearance anxiety experienced during adolescent is negatively correlated with parents' low educational levels (Özcan et al., 2013; Şahin, Barut \& Erşanl1, 2013), self-esteem (Çelik \& Güzel, 2018; Özcan et al., 2013; Şahin, Barut, Erşanlı and Kumcağız, 2014; Şirin, 2015) and
cognitive awareness (Çelik, Turan \& Arıcı, 2014) and positively correlated with social anxiety (Hart et al., 2008; Levingson \& Rodebaugh, 2011), extroversion (Levingson \& Rodebaugh, 2011), eating disorders (Brosof \& Levinson, 2017; Koskina et al., 2013), body checking behaviors (White, 2008) and risk-taking behaviors (Ekşi, Arıcan \& Yaman, 2016).

Social appearance anxiety can be caused by individual's self-evaluations and other peoples' evaluation of them (Hart et al., 2008). One of the channels for such evaluation can be social media. Social media has found itself an important place in everyday lives of people with the developments in Web 2.0 (Büyükşener, 2009). According to the report by Turkish Statistical Institute, 55.9\% of individuals use information technologies, and social media takes the first place among Internet usage purposes by $80.9 \%$ (TSI, 2015). A study found that $89.2 \%$ of adolescents had a social media account (Alican \& Saban, 2013). It was found in another study that $95.9 \%$ of adolescents had Internet access at home and $75 \%$ of them had a Facebook account (Tiggeman \& Slater, 2013). As suggested by recent studies, Instagram is the most preferred social media channel (Çömlekçi and Başol, 2019; Uysal, 2020). It has been concluded that younger and male adolescents use social media more (Alican \& Saban, 2013; Otrar \& Argin, 2014). Adolescents can socialize with their peers on Internet by keeping in touch with them and being informed about them (Ekşi, Erden, Erdoğan \& Yılmaz, 2013).

It is thought that social media channels cannot fully meet socializing needs of adolescents (Eni, 2017); however, communication with peers can be important to adolescents in this period (Steinberg, 2013). Given the popularity of social media use and socializing needs of adolescents, it can be more positive for adolescents not to prohibit the use of social media but work on problematic social media use (Banyai et al., 2017). Considering the problematic social media use by adolescents, it has been observed to be positively correlated with loneliness (Barry et al., 2017; Eni, 2017), unhealthy family functions (Yayman, 2019), loneliness in romantic and family relationships (Doğan and Karakaş, 2016), anxiety and depression (Barry et al., 2017) and negatively correlated with
self-esteem (Banyai et al., 2017; Kelly, Zilanawala, Booker \& Sacker, 2018) and cognitive flexibility (Peker \& Çukadar, 2016). On the other hand, internalization of appearances which are presented as being ideal in traditional media or social media (Özgüngör \& Arıcıoğlu, 2020; Trekels and Eggermont, 2017) can cause adolescents to develop anxiety about their own appearances. It was concluded in a research on Facebook usage by adolescents that adolescents followed fan groups more (Ekşi, Erden, Erdoğan \& Yılmaz, 2013). Hence, how they compare their own appearances with people whom they perceive as ideal on social media can lead to negative body image (Bayköse \& Esin, 2019; Ho, Lee \& Liao, 2016; Lee, Lee, Choi, Kim \& Han, 2014; Tiggeman \& Slatter, 2013).

Feedbacks received by adolescents on social media and comparing themselves with others have been found correlated with negative mental health (Bayköse \& Esin, 2019; Nesi \& Prinstein, 2015). Some of these feedbacks can be of disturbing content (Kelly et al., 2018). Thus, there might be discussions among adolescents (Ekşi, Erden, Erdoğan \& Yılmaz, 2013). Adolescents can be subjected to bullying behaviors of their peers and negative feedbacks on online platforms outside the school as well (Taştekin \& Bayhan, 2018).

Peer bullying or victimization is described as individual's repeated exposure to negative actions of a person or a group. Features of bullying include power imbalance between parties and victim's helplessness in defending themselves (Espelage \& Swearer, 2003; Olweus, 1994). Bullying-related behaviors include nicknaming, a group's negligence of the individual, aggressive behaviors, spreading untrue words about the individual, and other offending thoughts about the individual (Olweus, 2012). School is the primary setting where such behaviors are originated (Bayar \& Uçanok, 2012) Factors such as advancing technology and increased access to information have changed the nature of bullying. Accordingly, cyberbullying is described as purposeful, recurrent and hurting behaviors in online settings (e.g. computers, mobile phones) (Belsey, 2007; Hinduja \& Patchin, 2010). Characteristics that distinguish cyberbullying from classical bullying include that such behaviors take place not only in the school
environment but also online, that bullying is witnessed by more people, and that it is not necessarily a face-to-face action (Slonje \& Smith, 2008). Male students have been found to be in the risk group in exhibiting and being victimized by cyberbullying behaviors (Arıcak et al., 2008; ErdurBaker \& Kavşut, 2007; Peker, Eroğlu \& Çitemel, 2012). Furthermore, those who spend more time on Internet and have problematic Internet use might be exposed to cyberbullying and cyberbully others more (Altundağ, 2016; Serin, 2012). Risky environments for cyberbullying primarily include Facebook, text messages, and interactive gaming sites (Özdemir \& Akar, 2011). Adolescents can exhibit such behaviors for reasons such as feeling good, having fun, gaining popularity, and retaliating (Yaman \& Paker, 2012).

Cyberbullying behaviors may cause adolescents to develop negative feelings and thoughts (Şahin, Sar1, Özer \& Er, 2010). Among adolescents, those who construct their self-values on their physical appearances and share relevant posts on social media can be subjected to cyberbullying even more (Eroğlu \& Güler, 2015). It has been observed that cyberbullying experiences are negatively correlated with self-esteem (Chang et al., 2013; Patchin \& Hinduja, 2010) and positively correlated with depression (Ybarra, 2004; Chang et al., 2013), social anxiety (Coelho \& Romao, 2018; Fahy et al., 2016; Juvonen \& Gross, 2008), and loneliness (OlenikShemesh, Heiman \& Eden, 2012). In light of the abovementioned information, this research examined the relationships between high school students' social media attitudes, cyberbullying behaviors experienced by them and their social appearance anxiety.

## METHOD

## RESEARCH MODEL

This study was designed in the survey research model. In this research model which is suitable for research involving a large sample, it is attempted to determine views and thoughts of participants (Fraenkel, Wallen \& Hyun, 2012).

## PARTICIPANTS

The research participants were composed of 450 students studying at high schools in different
provinces of Turkey. 292 (65\%) of these students are girls and 158 ( $35 \%$ ) of them are boys. Ages of the students ranged between 14 and 18 years. Their mean age was found to be 16.45 years ( $\mathrm{sd}=1.14$ ). As for the age distribution, 11 students ( $2.4 \%$ ) were 14 years old, $104(23.1 \%)$ were 15 years old, 106 (23.6\%) were 16 years old, 128 ( $28.5 \%$ ) were 17 years old, and 101 ( $22.4 \%$ ) were 18 years old.

## MEASURES

## Demographics Form

Questions of the form asked participants about their age, gender, the most preferred social media channel, time they spared for social media in a day, and for how long they had been using social media.

## Social Media Attitude Scale

Developed by Otrar and Argin (2015), the Social Media Attitude Scale consists of 23 items. Of 23 items, 17 are positive statements and 6 are negative statements. The scale has four subscales which are need for sharing, social isolation, social competence, and relation with teachers. Cronbach's alpha of the scale was calculated to be .85 . Factor analysis conducted for validity studies found a KMO value of .83. The scale was developed in Turkey. The scale was applied to 302 secondary and high school students during development. It is therefore fit for applying to the sample of this research.

Social Appearance Anxiety Scale among Adolescents
Developed by Hart et al. (2008), the scale was adapted into Turkish by Doğan (2011). It is a 16item, 5 -point Likert scale. In the Turkish adaptation studies, the scale was found to have one factor and this one-factor construct explained $53.4 \%$ of the variance. The confirmatory factor analysis results indicated that the values were on a good level. The fact that the validity and reliability studies of the scale conducted with the age group of 12-15 years show that the scale is fit for use in this research. Cronbach's alpha of the scale was calculated to be . 91.

## Cyberbullying Scale

Developed by Stewart et al. (2014), the scale was adapted into Turkish by Küçük (2016). The scale consists of 16 items, 2 of which are multiple-choice and 14 of which are 5 -point Likert. The developers of the scale found the scale to have a high validity and reliability. Cronbach's alpha of the scale was calculated to be .87. In the Turkish adaptation studies, the scale was found to be valid and reliable.

## DATA ANALYSIS

Pearson's Product-Moment Correlation coefficient was used to analyze the correlations between the variables. Multiple Hierarchical Regression analysis method was utilized to find to what extent social appearance anxiety, and social media attitudes explained the levels of exposure to cyberbullying (Can, 2017; Kilmen, 2015). Participants were reached on online platforms in an attempt.

## FINDINGS

According to the demographic findings, 106 (23.6\%) of the students had been using social media for 1-3 years, $200(44.4 \%)$ for 3-5 years, and 144 ( $32 \%$ ) for more than 5 years. As for social media habits, 167 ( $37.1 \%$ ) of them spent 1-3 hours, 178 (39.6\%) 3-5 hours, 77 ( $17.1 \%$ ) 5-8 hours, and 28 ( $6.2 \%$ ) more than 8 hours on social media daily. The most used social media channel was found to be Instagram by $66.7 \%$, which was followed by YouTube by $20.7 \%$. Other preferred channels included WhatsApp (7.4\%), Twitter (5.3\%), and Facebook ( $0.9 \%$ ). As stated by the participants, 277 ( $61.5 \%$ ) had been subjected to cyberbullying via one way or more (text message, social media, games, etc.) within the last month, 136 ( $30.2 \%$ ) had cyberbullied others, and 132 ( $29.3 \%$ ) had been subjected to cyberbullying and cyberbullied others. Mean scores obtained by the participants in the scales of cyberbullying, social appearance anxiety and social media attitudes, Cronbach's alphas of the scales, and the relationships between the scores are examined in Table 1. Pearson's Product-Moment Correlation method was applied in the correlational analysis.

Table 1. Mean scores and Cronbach's alphas of the scales, and results of correlation

| Variables | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1. Cyberbullying | 1 |  |  |  |  |  |  |
| 2. Social Appearance <br> Anxiety | $.43^{* *}$ | 1 |  |  |  |  |  |
| 3. Social Media Attitudes | $.18^{* *}$ | $.11^{*}$ | 1 |  |  |  |  |
| 4. Social competence | $.40^{* *}$ | $.33^{* *}$ | $.70^{* *}$ | 1 |  |  |  |
| 5. Need for sharing | $.21^{* *}$ | $.11^{*}$ | $.84^{* *}$ | $.57^{* *}$ | 1 |  |  |
| 6. Relation with teachers | $.16^{* *}$ | $.13^{* *}$ | $.57^{* *}$ | $.38^{* *}$ | $.37^{* *}$ | 1 |  |
| 7. Social isolation | $.35^{* *}$ | $.29^{* *}$ | $-.13^{* *}$ | $.37^{* *}$ | $.19^{* *}$ | $.21^{* *}$ | 1 |
| Mean | 21.54 | 35.09 | 70.35 | 12.92 | 26.29 | 7.2 | 12.04 |
| Standard Deviation | 8.94 | 15.25 | 12.91 | 5.51 | 7.36 | 3.75 | 5.86 |
| Cronbach's alpha | 91 | 94 | 79 | 80 | 82 | 84 | 87 |

**p<0.01, *p<0.05

According to Table 1, social appearance anxiety scores and cyberbullying scores had a moderate positive significant correlation ( $\mathrm{r}=.43$, $\mathrm{p}<0.01$ ). Positive significant correlations were found between scores of cyberbullying and social media attitudes ( $\mathrm{r}=.18, \mathrm{p}<0.01$ ) subscales of social media attitudes which are social competence ( $\mathrm{r}=.40, \mathrm{p}<0.01$ ), need for sharing ( $\mathrm{r}=.21, \mathrm{p}<0.01$ ), relation with teachers ( $\mathrm{r}=.16, \mathrm{p}<0.01$ ) and social isolation ( $\mathrm{r}=.35, \mathrm{p}<0.01$ ). Positive significant correlations were also found between scores of social appearance anxiety and social media attitudes ( $\mathrm{r}=.11, \mathrm{p}<0.05$ ) subscales of social media attitudes which are social competence $(\mathrm{r}=.33, \mathrm{p}<0.01)$, need for sharing ( $\mathrm{r}=.11, \mathrm{p}<0.06$ ), relation with teachers ( $\mathrm{r}=.13, \mathrm{p}<0.01$ ) and social isolation ( $\mathrm{r}=.29, \mathrm{p}<0.01$ ). Scores of social media attitudes score were found to be positive significantly correlated with scores of social competence ( $\mathrm{r}=.70, \mathrm{p}<0.01$ ), need for sharing
$(\mathrm{r}=.84, \mathrm{p}<0.01)$, relation with teachers ( $\mathrm{r}=.57$, $\mathrm{p}<0.01$ ) and negative significantly correlated with social isolation scores ( $\mathrm{r}=.13, \mathrm{p}<0.01$ ). Subscale scores of social competence were found to be positive significantly correlated with scores of need for sharing ( $\mathrm{r}=.57, \mathrm{p}<0.01$ ), relation with teachers $(\mathrm{r}=.38, \mathrm{p}<0.01)$ and social isolation ( $\mathrm{r}=.37, \mathrm{p}<0.01$ ). Subscale scores of need for sharing were found to be positive significantly correlated with scores of relation with teachers ( $\mathrm{r}=.37, \mathrm{p}<0.01$ ) and social isolation ( $\mathrm{r}=.19, \mathrm{p}<0.01$ ). A positive significant correlation was found between the subscale scores of relation with teachers and social isolation ( $\mathrm{r}=.21$, $\mathrm{p}<0.01$ ). Multiple Hierarchical Regression analysis results are presented in Table 2. At the beginning of the regression analysis, social appearance anxiety scores were in the first block. Scores of social media attitudes were included in the second block.

Table 2. Multiple hierarchical regression analysis on levels of exposure to cyberbullying

|  |  | R | $\mathrm{R}^{2}$ | $\mathrm{R}^{2} \mathrm{ch}$ | B | $\beta$ | t | p |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | Constant | . 43 | . 18 | . 18 | 12.75 |  | 13.31 | 0.00 |
|  | Social Appearance Anxiety |  |  |  | 0.25 | 0.43 | 10.00 | 0.00 |
| 2 | Constant | . 53 | . 28 | . 27 | 6.96 |  | 4.46 | 0.00 |
|  | Social Appearance Anxiety |  |  |  | 0.18 | 0.30 | 7.00 | 0.00 |
|  | Need for sharing |  |  |  | 0.02 | 0.02 | 0.35 | 0.72 |
|  | Relation with teachers |  |  |  | -0.01 | -0.00 | -0.12 | 0.90 |
|  | Social Competence |  |  |  | 0.36 | 0.22 | 4.72 | 0.00 |
|  | Social Isolation |  |  |  | 0.27 | 0.18 | 4.01 | 0.00 |

As shown in Table 2, social appearance anxiety alone explained $18 \%$ of cyberbullying ( $\mathrm{R}^{2}=0.18$, $\mathrm{p}<0.01)$. When scores of need for sharing, relation with teachers, social isolation and social competence which are subscales of social media attitudes were included in the model, all of them were found to explain $28 \%$ of cyberbullying $\left(\mathrm{R}^{2}=0.28, \mathrm{p}<0.01\right)$. In the model, cyberbullying
scores were observed to be positive significantly predicted by scores of social appearance anxiety
( $\beta=0.30, \quad \mathrm{p}<0,01$ ), social competence $(\beta=0.22$, $\mathrm{p}<0,01$ ) and social isolation ( $\beta=0.18, \mathrm{p}<0,01$ ).

## DISCUSSION

In this research, the relationships between exposure to cyberbullying, social media attitudes and social appearance anxiety was examined. The analyses performed accordingly indicated that high school students are under risk in regard to cyberbullying. As reported by the students, $61.5 \%$ had been subjected to at least one of the cyberbullying behaviors within the last month, $30.2 \%$ had exhibited cyberbullying behaviors, and $29.3 \%$ had been subjected to cyberbullying and cyberbullied others. In a study on prevalence of cyberbullying, it was found that $35.7 \%$ of students exhibited cyberbullying behaviors, $23.8 \%$ of them were both bullies and victims, and $5.9 \%$ were victims (Arıcak et al., 2008). In another study, 29\% of students were found to be victims while $11 \%$ were bullies (Patchin \& Hinduja, 2006). Higher rates and numbers found in this study than in others were attributed to the fact that the adolescents had spent much time on social media and digital games during the latest isolation process within the last month.

According to the correlational analyses, adolescents' levels of social appearance anxiety increased with increased levels of exposure to cyberbullying. Since social appearance anxiety can be influenced by external evaluations, negative feedbacks received by adolescents on digital media can adversely affect them. Online bullying has been emphasized to be correlated with social anxiety (Coelho \& Romao, 2018; Fahy et al., 2016; Pabian \& Vandeboch, 2016). Another study concluded that body dissatisfaction predicted cyberbullying (Salazar, 2017). A low positive correlation was found between social media attitudes and social appearance anxiety. Problematic social media use was found to be correlated with anxiety in the literature (Woods \& Scott, 2016). Social appearance anxiety is addressed as a type of anxiety. Studies have shown that individuals using social media channels such as Instagram and Facebook develop social physique anxiety and social appearance anxiety more (Aston, 2018; Doğan \& Çolak, 2016; Intan, 2019). Another finding of the present study is the positive correlation between cyberbullying and social media attitudes. It is stated that social media bears more risk for cyberbullying (Özdemir \& Akar, 2011) and those who spend more time on

Internet and have problematic Internet use form the risk group for cyberbullying (Altundağ, 2016; Serin, 2012). Positive significant correlations were found between scores of need for sharing, social isolation,
relation with teachers, and social competence which are the subscales of social media attitudes. According to the regression analysis, scores of social appearance anxiety and subscale scores of social media attitudes explained $28 \%$ of cyberbullying. Cyberbullying was found to be predicted by the scores of social appearance anxiety, social isolation and social competence. In regard to social competence which involves subjects such as need for prestige, establishing and maintaining relationships with friends, adolescents can spend more time on social media. In a study, duration of weekly Internet use was observed to a predictor of cyber-victimization (Peker, Eroğlu \& Ada, 2012). In other studies, it has been emphasized that those who have problematic Internet use are under risk for cyber-victimization and cyberbullying (Altundağ, 2016; Eroğlu \& Güler, 2015; Kırcaburun, Demetrovics, Kiraly \& Griffiths, 2018; Serin, 2012). Regarding social isolation, friendships and family relations can be negatively affected by the time that adolescents spend on social media. A study found that increased frequency of social media use affected family communication negatively (Demir, 2016). Another study found cyberbullying and loneliness to be correlated (Olenik-Shemesh, Heiman \& Eden, 2012). Self-esteem, empathy, and loneliness were found to be predictors of cyberbullying (Brewer \& Kerslake, 2015). It was found in the present study that social appearance anxiety predicted cyberbullying positive significantly. It is seen in the literature that social anxiety and cyberbullying are positively correlated (Coelho \& Romao, 2018; Fahy et al., 2016; Juvonen \& Gross, 2008). Students who have social appearance anxiety as a type of social anxiety may be under risk for cyberbullying. This research aimed to examine the relationships between social media attitudes, cyberbullying and social appearance anxiety. Significant correlations were found in all score types. A correlation was found between cyberbullying and social appearance anxiety. Higher scores of social media attitudes among adolescents might cause them to be subjected to cyberbullying. By its nature, cyberbullying can affect students in different domains. For social appearance anxiety which can increase with bodily changes during adolescence, cyberbullying is a
risky factor. Thus, it is important to carry out activities for teachers, students and parents about "safe internet and social media use" within the scope of psychological counseling and guidance services in schools. The research contains information for
school counselors in terms of practices in schools. School counselors can benefit from this information for their practice. On the other hand, when the limitations of the study were examined, the data was collected online, due to the Covid-19 pandemic. In addition, students may have spent more time on social media and internet during this pandemic

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## Usage of Universal Design for Learning in Mathematic Course


#### Abstract

The aim of this study is to investigate the effect of Universal Design for Learning on students' academic achievement and attitudes towards mathematics course, and to reveal the opinions of the students about Universal Design for Learning. In this study, the concurrent embedded strategy was used. The participants consisted of 33 primary school students from two different 4th grade classes at a primary school. In the quantitative part of the study, non-equivalent control groups design was utilized. Data were collected through an academic achievement test and an attitude scale. The findings indicated that Universal Design for Learning had a large effect on academic achievement and attitudes towards mathematics course. In the qualitative part of the study, case study was used and data were collected through a focus group interview. The students participating in the interview were identified with a maximum variation sampling method. The students stated that Universal Design for Learning improved their attention, interest, cooperation, and self-regulation skills. They also stated that Universal Design for Learning supported their retention of knowledge, multiple representations of knowledge, and active participation to lesson. As a result, Universal Design for Learning is thought to be one of the effective methods in mathematic courses and its use is recommended. This study was derived from the master's thesis named "The Effect of Universal Design for Learning on Students Academic Achievement and Attitude towards Mathematic Course".


Keywords: Academic achievement, attitude, primary school students, student opinions, universal design for learning

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Universal Design (UD) approach was applied in architecture and products design (Rose, 2000). UD became philosophical basis in the design of many educational products and environments (Burgstahler, 2007). The adaptation of UD principles to education had yielded good results only in educational technologies (Eagleton, 2008), as it was not supported by brain research. (Hitchcock \& Stahl, 2003). So, The Center for Applied Special Technology (CAST) developed Universal Design for Learning (UDL) by supporting brain researches.

Modern neuroscience sees the brain as a complex link of interconnected networks, rather than as a collection of discrete structures with specific functions. Learning is also seen as a change in connections within and among these networks (Meyer, Rose \& Gordon, 2014). UDL focuses on three brain networks: recognition networks, strategic networks, and affective networks. Three basic principles were developed based on these networks. The principles of UDL are "to provide multiple means of representation, to provide multiple means of action and expression, to provide multiple means of engagement" (CAST, 2018). These principles taken into account the varied students, including students in the margins. They were used to guide the design of learning tools, methods and environments (Meyer et al., 2014).

The recognition networks help us understand and interpret the patterns of sound, light, taste, smell, and touch. These networks enable us to recognize more complex patterns such as an author's style and differences as well as abstract insights, sounds, faces, letters, words, and justice. The principle of providing multiple means of representation bring recognition networks together. These networks allow us to interpret and define the stimuli that reach us through our sensory organs. It helps us to find not only simple and complex but also abstract and concrete meanings. As a result, our brain and body interact with sensory inputs that affect our learning (Rose \& Meyer, 2002).
Students differ in the way they perceive and, then understand the information presented to them. For example, students with sensory disabilities (such as students with hearing and visually impaired), learning disabilities (such as dyslexia), language or
cultural etc. differences need different ways to enable them to reach content. So, it is necessary to use multiple representation tools (CAST, 2018).

The strategic networks control complex strategic capacities which determine goals, planning appropriate strategies, and self-monitoring. The principle of providing multiple means of action and expression brings together strategic networks (Rose \& Meyer, 2002). This principle is related to students' goal setting, planning, strategy formation, use, and organization of information and resources. It provides options to monitor students' own progress in these areas (Nelson, 2014). Students reflect what they have learned in a learning environment and can express what they know in different ways. So, the multiple means of action and expression must be provided to indicate their own learning.

Affective networks impart emotional significance to objects, actions and, patterns. The principle of providing multiple means of engagement brings together affective networks (Rose, 2001). They involve to develop interest, motivation and, more importantly, strong self-regulation capabilities in the learners. Students have in their ways of being engaged or motivated to learn. (Meyer et al., 2014). In fact, there is no optimal means of engagement for all students in all areas. It is essential to offer multiple options for engagement (CAST, 2018).

## IMPORTANCE OF THE RESEARCH

"Nobody is the same as someone else." approach has been adopted in the mathematics curriculum (Ministry of National Education of Turkey [MEB], 2018). This approach overlaps with the UDL approach. According to UDL, individual differences are natural in the learning environment. It is necessary to provide fair and
equal opportunities to students with different abilities, backgrounds and motivations. In addition, UDL aims for all students to become an expert learner. For these reasons, there is no a
single representation, a single action and expression, a single motivation and a single
assessment tool in UDL. UDL is a teaching model that requires planning the course to cover all student variability, including students with the margins (Meyer et al., 2014). Therefore, UDL could be effective in ensuring students have the desired skills. In addition, it was thought that UDL could be appropriate for students to achieve the goals, objectives and skills in the Mathematics curriculum.

## PURPOSE OF THE RESEARCH

The aim of this study is to investigate the effect of UDL on students' academic achievement and attitudes towards mathematics course, and to reveal the opinions of the students about UDL.

## PROBLEMS

For this purpose, answered to the following subproblems were sought:

1. Does UDL have an effect on students' academic achievement in mathematics course?
2. Does UDL have an effect on students' attitudes towards mathematics?
3. What are the student opinions about UDL applied in mathematics course?

## METHOD

In this study, concurrent embedded strategy from mixed methods was used as research design. A mixed method is defined as a type of research in which qualitative and quantitative methods are used together (Creswell, 2012). In the quantitative part of the study, non-equivalent control groups design was utilized. In this design, students are not randomly assigned to a group. Instead, one of the equivalent groups is assigned as an experiment and the other as a control group (Gay \& Airasian, 2000). In the qualitative part of the study, case study was used. The case study model is defined as a current phenomenon that runs within real-life boundaries; that the boundaries between the phenomenon and related content are not clearly separated; used in cases where more than one evidence or data source is available (Creswell, 2012). The achievement test and attitude scale were applied as pre-test to the experimental and
control groups before the treatment. During the study, UDL was applied in the experimental group
and the teaching based on curriculum was applied in the control group. After the treatment, the achievement test and attitude scale were applied as the post-test to both groups. In addition, the experimental group students were interviewed with respect to the UDL applications during the study.

## PARTICIPANTS

The participants consisted of 33 students studying in two different $4^{\text {th }}$ classes. There were 16 students ( 12 girls and 4 boys) in experimental group and 17 students ( 6 girls and 11 boys) in control group. This indicates that the distribution of female and male students is not equal in both groups. So, factorial covariance analysis was performed to determine whether gender factor has an impact on the dependent variable. At the end of the analysis, it was found that gender was not an effective factor on students' achievement $\left(\mathrm{F}_{(1,32)}=0.104 ; \mathrm{p}>0.05\right)$ and attitudes towards the course $\left(\mathrm{F}_{(1,32)}=0.010\right.$; $\mathrm{p}>0.05$ ).

In order to examine whether the groups were equal or not before the study, independent samples t-test was applied in the comparison of the pre-test mean scores of the achievement test and attitude scale was applied to the students. It was observed that there was no significant difference between the experimental group ( $\mathrm{M}=11.00$; $\mathrm{SD}=3.70$ ) and the control group ( $\mathrm{M}=9.52$; $\mathrm{SD}=2.42$ ) in terms of achievement pre-test mean scores $\left(\mathrm{t}_{(31)}=1.35\right.$; $\mathrm{p}>0.05$ ). Also, it was observed that there was no significant difference between the experimental group ( $\mathrm{M}=4.22$; $\mathrm{SD}=0.51$ ) and the control group ( $\mathrm{M}=4.00$; $\mathrm{SD}=0.61$ ) in terms of attitude scale pretest mean scores $\left(\mathrm{t}_{(31)}=1.12 ; \mathrm{p}>0.05\right)$. These analysis results indicate that the pre-test mean scores of the achievement test and attitude scale of the experimental and control groups were equivalent before the study.

## INSTRUMENTS

## ACADEMIC ACHIEVEMENT TEST

There are 26 objectives from the Primary School $4^{\text {th }}$ Grade Curriculum. Two questions were prepared to measure each of the 26 goals and a trial form consisting of 52 questions was
developed. The trial form was applied to a total of 234 fifth graders. In order to select final test
questions, item difficulty and distinguishing index of the test was examined. Considering the content validity of the questions, it was tried to choose questions with medium difficulty ( $\mathrm{pj}=0.50$ ) and high level of distinctiveness (rjx>0.30). The final test consisted of 26 questions. Mean of item difficulty index of test items was 0.508 , mean of item distinguishing index was 0.617 . Cronbach Alpha internal consistency coefficient was calculated as 0.87 .

## MATHEMATICS ATTITUDE SCALE

The scale consisting of 18 items was developed by Aladağ (2005). The scale items used in the study consist of nine positive and nine negative expressions. The scale was prepared in form of 5point Likert type. The Cronbach Alpha reliability of the scale was calculated as 0.82 . The reliability of the scale in this study was found to be 0.84 .

## INTERVIEW

Interview questions were prepared to take the opinions of students about UDL. The participants were selected by maximum variation sampling. The students to be interviewed were determined by taking into consideration the successes in the mathematics course. Two high achieving, two medium achieving, and low achieving students were selected. In addition, students who can express themselves well were carefully selected. The interview was conducted at the same time as all the students with focus group discussion. The reliability of the interview was coded by both researchers and the number of codes in consensus was divided by the total number of codes. The reliability coefficient was found to be 0.87 .

## PROCESS

An 18 -week study plan was prepared according to the UDL to be applied in the experimental group.

The lesson plan, which was prepared in such a way as to include each principle of the UDL, was finalized by taking an expert opinion. According to the study plan, pre-tests were applied to the experimental and control groups during the first week. In the following weeks, teaching activities were carried out in accordance with the lesson plan. At the end of the study, post-tests were applied to both groups and six students from the experimental group were interviewed.

## DATA ANALYSIS

The paired samples t-test was used to compare the pre-test and post-test mean scores of the experimental and control groups. Factorial covariance analysis was performed to determine whether there was a significant difference between the post-test scores. Eta square value $\left(\eta^{2}\right)$ is interpreted as no effect up to 0.01 , as small effect between $0.01-0.06$, medium effect between $0.06-$ 0.14 and have a large effect on 0.14 (Green, Salkind \& Akey, 2000). Descriptive analysis was utilized to analyze the data obtained from the interview. The data obtained for the purpose of examining the contribution of UDL to the teaching process and learning outcomes are accumulated under attention, interest, multiple representation, cooperation, retention, active participation, self-regulation codes.

## RESULTS

1. Results Related to the Students' Academic Achievement

Firstly, the experimental and control group students' achievement test pre-test mean scores and post-test mean scores were compared with paired samples $t$-test. The data obtained are presented in Table 1.

Table 1. Paired Samples t-test Results

|  |  | Experimental Group |  |  |  |  |  | Control Group |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Test |  | N | M | SD | df | t | p | $\eta^{2}$ | N | M | SD | df | t | p | $\eta^{2}$ |
| Ach. <br> Test | Pre-test | 16 | 11.00 | 3.70 | 15 | $-9.93^{*}$ | 0.000 | 0.87 | 17 | 9.52 | 2.42 | 16 | $-4.16^{*}$ | 0.001 | 0.52 |


|  | Post-test | 16 | 20.37 | 5.13 |  |  |  |  | 17 | 13.58 | 3.16 |  |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| ${ }^{*} \mathrm{p}<0.05$ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

According to Table 1., there was a significant difference between the experimental group students' academic achievement pre-test mean scores $(M=11.00 ; \mathrm{SD}=3.70)$ and post-test mean scores $(M=20.37 ; S D=5.13)$ in favor of the posttest ( $\mathrm{t}(15) ; 9.93 ; \mathrm{p}<0.05)$. The eta square value $\left(\eta^{2}\right)$ of this difference was calculated as 0.87 . This value indicated that UDL had a large effect on students' mathematics achievement. This value also implied that UDL predicted $87 \%$ of the students' mathematics achievement. Similarly, there were significant differences between the pre-test mean scores $(M=9.52 ; S D=2.42)$ and the post-test mean scores $(M=13.58 ; S D=3.16)$ of the control group
students' in favor of the post-test $\left(\mathrm{t}_{(16)}=4.16\right.$; $\mathrm{p}<0.05)$. The eta square value $\left(\eta^{2}\right)$ of this difference was calculated as 0.52 . Accordingly, these values indicated that teaching based on curriculum had a large effect on students' mathematics achievement. This value implied that teaching based on curriculum predicted $52 \%$ of the students' mathematics achievement.

The post-test means for the achievement test of both groups were compared with covariance analysis. The pre-test scores were designated as covariance. The data obtained are presented in Table 2.

Table 2. ANCOVA Results

| Post-test | Source | Sum of Square | df | F | p | $\eta^{2}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Ach. Test | Pre-Test | 105.614 | 1 | 7.056 | 0.007 | - |
|  | Group | 260.903 | 1 | 17.431* | 0.000 | 0.38 |
|  | Gender | 13.571 | 1 | 0.907 | 0.349 | - |
|  | Gender * Group | 1.553 | 1 | 0.104 | 0.750 | - |
|  | Error | 419.103 | 28 | - | - | - |
|  | Corrected total | 935.515 | 32 | - | - | - |

Table 2 depicted that there was a significant difference in favor of the experimental group between the post-test mean scores of the experimental and control group students when academic achievement pre-test mean scores ( $\mathrm{F}_{(1,32)}=17.431$; $\mathrm{p}<0.05$ ) were held constant. Accordingly, it indicated that UDL was more effective in increasing students' mathematics
achievement than teaching based on the curriculum. The eta square value ( $\eta^{2}$ ) of this difference was calculated as 0.38 . This value signified a large effect. This value also depicted that UDL had a 38\% larger effect on students' achievement in mathematics course than teaching based on the curriculum.
mean scores were compared with paired samples ttest. The data obtained are presented in Table 3.

Table 3. Paired Samples t-test Results

|  | Experimental Group |  |  |  |  |  |  | Control Group |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Test | N | M | SD | df | t | p | $\eta^{2}$ | N | M | SD | df | t | p | $\eta^{2}$ |  |
| Attitude Scale | Pre-test | 16 | 4.26 | 0.43 | 15 | $-3.45^{*}$ | 0.04 | 0.44 | 17 | 4.00 | 0.61 | 16 | -0.46 | 0.64 | - |


|  | Post-test | 16 | 4.55 | 0.29 |  |  |  |  | 17 | 4.07 | 0.74 |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |

With regards to attitude scores, Table 3 depicted that there was a significant difference between the pre-test mean scores ( $\mathrm{M}=4.26$; $\mathrm{SD}=0.43$ ) and the post-test mean scores ( $\mathrm{M}=4.55$; $\mathrm{SD}=0.29$ ) of the experimental group students' in favor of post-test $(t$ $\left.{ }_{(15)}=3.45 ; \mathrm{p}<0.05\right)$. The eta square value $\left(\eta^{2}\right)$ of this difference was calculated as 0.44 . This result demonstrated that UDL had a large effect on students' attitudes towards mathematics course. This value also indicated that UDL predicted $44 \%$ of the students' attitudes towards mathematics course. But, there was no significant difference ( t
(16) $=0.46 ; \mathrm{p}>0.05$ ) between the pre-test mean scores ( $\mathrm{M}=4.00 ; \mathrm{SD}=0.61$ ) and the post-test mean scores ( $\mathrm{M}=4.07 ; \mathrm{SD}=0.74$ ) of the control group students. Accordingly, it was understood that teaching based on curriculum was not effective in increasing students' attitudes towards mathematics course.

The post-test means for the attitude scale of both groups were compared with covariance analysis. The pre-test scores were designated as covariance. The data obtained are presented in Table 4.

Table 4. ANCOVA Results

| Post- | Source | Sum of Square | df | F | p | $\eta^{2}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Attitude Scale | Pre-Test | 3.579 | 1 | 14.582 | 0.001 | - |
|  | Group | 0.664 | 1 | 2.707 | 0.111 | - |
|  | Gender | 0.19 | 1 | 0.078 | 0.783 | - |
|  | Gender * Group | 0.002 | 1 | 0.010 | 0.921 | - |
|  | Error | 6.872 | 28 | - | - | - |
|  | Corrected total | 12.458 | 32 | - | - | - |

Table 4 depicted that there were no significant differences in favor of the experimental group between the post-test mean scores of the experimental and control group students when attitude scale pre-test mean scores ( $\mathrm{F}_{(1,32)}=2.707$; $\mathrm{p}>0.05$ ) were held constant. Accordingly, it revealed that UDL did not have a significant effect on students' attitudes towards mathematics course compared to teaching based on the curriculum.
Findings Related to the Student Opinions about UDL
3. Results Related to the View of Students' about UDL

In this part, the student opinions on UDL had been presented. The data obtained after the interview was analyzed by descriptive analysis. Codes obtained were presented respectively.

## ATTENTION

In order for any subject to be learned, attention must be paid first. Although there are many stimuli in the environment, the attended stimulus is perceived and learned (Woolfolk, 2001).

S4: ... I wasn't paying attention. When you teach something, and I go to the front row, it caught my attention and I could see well.

As a result of the change in the place in the classroom, student 4 had an important role in perception, and it affected the level of attention positively. Accordingly, it showed that the regulation of the environment according to the needs of the individual might positively increase the attention in the course.

> S1: ... I was constantly distracted beforehand. I'm not distracted anymore.

Unentertaining lesson distracted students' attentions and directed them to various stimuli. Therefore, lessons needed to be planned an interesting way.

## INTEREST

Another important factor in learning is interest. Students need to be interested in the subject to be able to learn. Although the interest of the students
depends on many factors, the course should be planned in accordance with the level of the students and remarkably.

> S4: ... I didn't like math when you were new, I didn't care, I didn't pay attention.... I can solve problems now.
> S3: ... I didn't care, I wasn't doing anything. ... My sister writes on paper and I solve it at home. ... I can understand better.
> S2: ... I didn't like math when you were away. I started to like you when you came. ... I didn't want to solve problems when I went home before. I want my sister to write a problem now. She writes and I solve it.

The students' opinions indicated that they overcame their missing learning and skills with the studies that in accordance with levels and attracted the interest of the students. According to the representation principle of the UDL, it is important to activate and supply background knowledge in providing options for comprehension. It could be said that learning deficiencies of students were solved and background knowledge was tried to be formed and so their interest increased in the class and their interest continued outside the school.

> S2: ... I was looking at the books before, not listening. It was a lot of fun telling you. .. I was learning everything.

The statement of student 2 revealed that the interesting way of explaining the subject increased the interest of students and facilitated learning. Thus, it was effective in providing the students with the opportunity to perceive the audio-visual alternatives and to enable them to express the information, which aligned with the UDL requirement.

## MULTIPLE REPRESENTATION

To learn any subject, students need representation tools and various activities appropriate to the level of the students who aim to show their learning objectives and what they have learned. Students have the opportunity to choose the appropriate tools and activities. Exposing students to various activities in the learning environment also serves
the purpose of creating expert learner parallel to the purpose of the UDL.

> S2: ... You didn't write, you put papers on the board.
> S1: ... You were never writing. ... You were making a big paper, hanging on the board. ...

Based on statements of the students, it assumed that there were studies about the principle of representation of UDL. Here, it was aimed to activate or supply background knowledge and to emphasize the critical features of the subject and the relations between the subjects in order to provide the students with the options for comprehension the subject. When students focused on writing, they could overlook critical features and key concepts. This might cause problems in comprehension of the subject. It indicated that multiple representations increased transfer of learning.

S2: ... We were making activities.
S6: ... We were doing group work.
The aim of the above-mentioned studies was to provide learning by providing multiple means of action and expression from UDL principles. Through the diversification of activities, students' skills and interests could be addressed and could be possible to learn the subject. It was difficult to address all students and taught the subject with a single activity. In the activities carried out in the classroom, multiple representations were ensured by paying attention to individual differences.

## S4: ... I loved the shortcut of the division. Zeros go, division ends.

Students: ... Multiply, subtract, down, do it again (showing with hand gestures).

According to these expressions, it was understood that the students were offered options to express their taught subject. For this purpose, rhymes and hand gestures were used. Student 4's said rhymes about the shortcut of the division and all students' showed each stage of the division process by hand gestures could also provide that there were multiple representations in providing options for representation.

S3: ... We were doing activities on the smart board.

Student 3 referred to the use of technology. The aim was to provide learning by providing multiple representations from the principles of the UDL. It had also been applied to the use of technology in other UDL principles such as providing multiple means of action and expression, providing multiple means of engagement. Thus, technology was used as a tool to provide multiple representations.

> S5: ... You did something like a crocodile, played with them.
> S6: ... You gave us something like a hat. ... we found the shape that disrupts the pattern.

Students 5 and 6, mentioned that the games used to teach the subject. It was aimed to provide multiple means of representation by using games as well as activities in the courses.

## COOPERATION

Sometimes students may be inadequate in expressing and indicating they have difficulty in learning. At this stage, peer teaching can help these students. Organizing collaborative activities helps students learn from each other and express themselves more easily. They also develop their skills in working together and helping.

> S1: ... Our friends were attending with us. ... They weren't helping me. ... We didn't do it all together in the group works, but then we started to do it.

S2: ... We did everything we learned with our friends.

Student 1's statements indicated that they did not know how they did group work. But then it described that they began to learn how to work together and develop these skills. This situation was understood from the statements of student 1 and 2.

> S3: ... I was asking my friends what I did. ... My friends also were asking me. I was answering them.

Students might have the opportunity to work together with group work, and also might overcome
their lack of learning by sharing what they had learned with each other. So, it implied that the students had carried out activities to provide multiple means of action and expression from the UDL principles. Also, it indicated that the students had the opportunity to communicate with their friends both by choosing the activity what they wanted and by sharing what they had learned. In addition, it could be noted that the students conducted peer counselling, which signals that these activities had a room for facilitating as well as fostering collaboration and community.

## RETENTION

The retention allows students to prevent them from forgetting what they have learned and to transfer what they have learned to other situations. The aim of UDL is to ensure the student to become an expert learner. In order to be an expert learner, the information learned must be permanent. Thus, students can use what they have learned in new situations.

S6: ... It keeps in mind that you're constantly repeating. I remember from there.

Student 6, emphasized the repetition with the related subject as the reason for remembering what they had learned. In this study, the effect of repetition was emphasized by students. In addition, enriched activities related to the teaching of any subject were included in the UDL. In this way, the students had the opportunity to demonstrate what they had learned and to make up for their deficient learning and to consolidate what they had learned.

> S3: ... Shortcut of the multiplication. ... such as 4 times 1,4 . We were putting zeros on the side. I like that very much.

Above, the expression of the students explained how to do the shortcut of the multiplication. Here, in fact, the UDL's guiding principles referred to the offering options for comprehension. Because the activities carried out in order to provide comprehension of the subjects in representation
were used to emphasize critical features, relationships and thus to be effective in providing retention. It indicated that UDL positively affected retention. This was understood from the student's
statement as regards how to make the subject of the shortcut of the multiplication taught in the $10^{\text {th }}$ week of the study.

S4: ... I loved the shortcut of the
division. Zeros go, division ends.
S5: ... I was so scared I couldn't do the division. It was very simple when you taught it the short way. Students: ... Multiply, subtract, down, do it again (showing with hand gestures).

Above statements referred to the rhymes and hand gestures which were used to teach the critical features of the division. The student 4 said that rhyme about the subject remembered what he had to do about the subject and rhymes had a positive effect on retention. From the statements and the experiences of student 5 in the classroom, it could be deduced that the most difficult subject in the mathematics course was the division. The division process had to be done both in a sequence and also required cognitive skills such as division, multiplication, subtraction. It was quite natural that students with learning disabilities related to these procedures also had difficulties in dividing. In order to eliminate this difficulty, each stage of the division process was described in relation to a hand gesture. During the interview, all the students said that retention was positively affected by (a) the stages of the division process with hand gestures, (b) learning the stages of the division process, and (c) the use of body language in emphasizing the critical features.

> S1: ... I started to do it myself because I learned very well. I didn't get any help from anyone at my homework.

Student 1 stated that $\mathrm{s} /$ he could do his / her work at home without help. We could conclude from this sentence that the student did not forgotten what $\mathrm{s} / \mathrm{he}$ had learned at school and could also apply to his/her work at home.

## ACTIVE PARTICIPATION

Students participate actively in activities to learn the subjects. For this, the students must first be willing. Accordingly, the planning and
implementation of instruction will affect the active participation positively as it will attract student interest.

## S4: ... Teacher, I started to participate more in course. I didn't care before.

Above statement, it was mentioned that the lessons taught by using UDL increased the participation and interest. According to UDL, it is important that present the subjects to students with remarkable and appropriate options. Thus, student 4 stated that UDL contributed to the participation in the course and to be considered important of the course.

## SELF - REGULATION

Pre-evaluation of the students help them to see their deficiencies. The student who detects the deficiency in himself/herself will be able to make self-regulation as $\mathrm{s} / \mathrm{he}$ tries to eliminate these shortcomings. The student who tries to eliminate the deficiencies and make self-regulation will take a step towards becoming an expert learner.

> S4: ... I gave myself four first, because I never listened to you. Then I started to give myself five, because I was listening. ... I had little help. Then I did it myself.
> S3: ... I was looking at books before, but I couldn't learn. ... I gave myself four first. Then I listened to you, listened and started to give 5. ... I couldn't do it before, but now I'm doing it.

Above statement, students talked about the effect of self-assessment on listening to the lesson. It showed that the students started listening to the lesson when they learned that they will evaluate themselves, and they wanted to give high marks. Here, students stated that they gave mark to the behaviour of listening to the course, not to the level of learning the subject. According to UDL,
students needed to be enabled to make selfregulation. The students had made such an arrangement by thinking that their listening behaviour was incomplete from the statement of student 3. This situation was also important in learning.

> S2: ... I didn't trust myself. You came and said that you will give yourself points before you explain the lesson. I've started to listen to you better. I listened better in order to win 5 points and to give myself 5 points....

Student 2's statements indicated that $\mathrm{h} /$ she did not trust $\mathrm{h} / \mathrm{her}$. However, it could be said that listening to the course to give a high mark, changed this situation. With this activity, it could be said that expectations and beliefs were tried to be encouraged.

> S1: ... I already gave you 5 points because I was listening very well. Then also I gave 5 points to myself. .. I was doing it at home and in school alone, without any help from anyone. ... I always started to do it myself because I learned very well. I never got any help from my homework.

It could be said from the above statement that Student 1 was aware of why $\mathrm{h} /$ she should listen to the course. $\mathrm{H} /$ she thought that $\mathrm{h} /$ she had the right to get a high mark because $\mathrm{h} /$ she studied without help. From the statement, it could be said that the student had learned the subject.

## CONCLUSIONS AND DISCUSSION

It was concluded that both the UDL and the teaching based on the curriculum had a large effect on the academic achievement of students in a mathematics course. However, it was concluded that UDL had a larger effect on increasing students' achievement in mathematics compared to teaching based on the curriculum. Achievement is related to recognition networks of the brain and to provide multiple means of representation principle. Because students achieve the highest level of learning when they can use what they have learned. This principle aims to enable the student to develop and reach sufficient maturity. When
students have the opportunity to work on this principle, they become self-fulfilling learners (Nelson, 2014). Thomas, Garderen, Scheuermann and Lee (2015) concluded that when the development of mathematical language and thought was supported by the solutions offered by UDL, students could make sufficient progress in
mathematics. Franz, Ivy and McKissick (2016) determined that the problem-solving instructions given in accordance with the UDL principles in mathematics course were effective in developing the students' problem-solving skills. Kennedy, Thomas, Meyer, Alves and Loyd (2014), in their study on the social studies course, found that the implementation of UDL in the classroom increased the students' success and decreased learning variances among the students. Hall, Cohen, Vue and Ganley (2015) concluded that UDL-based online applications developed with the strategic reader tool increased the achievement of students with disabilities. Yuzlu and Arslan (2017) found that UDL was more effective than the traditional method to improve students' learning of grammar structure in English teaching. According to all these findings and results, UDL could be used to increase the academic achievement of students in primary school mathematics courses.

When the findings of the study about the attitude towards mathematics course were examined, it was concluded that UDL had a large effect on increasing students' attitudes towards mathematics lesson. It had been concluded that teaching-based on curriculum was not effective in increasing students' attitudes towards mathematics. In addition, it was concluded that UDL did not have a significant effect on the students' attitudes towards mathematics course compared to teaching-based on the curriculum. It is very important to provide options for engagement in affective development because there is not a single tool suitable for all students, which resonates with one size, does not fit all as indicated by UDL. Creating a desire to learn in students is the most important thing that educators can do to make students become experts. It is necessary to provide support for each student to assess the level of difficulty, to be aware of the task of learning, and to help them deal with learning tasks and right balance should be established between supports (Meyer et al., 2014). In a lesson planned and processed in this way,
students' attitudes towards the course may develop depending on the development of affective features. Felton (2012) determined that mathematics teachers who took and applied UDL and strategic planning training had changed their attitudes after in-service training and these changes were observed in class observations and document reviews.

According to all these results, UDL could be employed in primary school mathematics lessons in order to increase that the students' attitudes towards mathematics course.In this study, it was concluded that UDL increased the attention of students. According to the UDL, attention is related to affective networks. Affective networks enable us to evaluate models in participation in the course and to make emotional connections with them (Rose \& Meyer, 2002). As stated by the students, it was seen that the classroom environment was arranged according to individual needs and also planning of the course by taking account into student diversity was effective in drawing attention. Jeon and Lee (2017) stated that various activities in which UDL was used in primary school English courses gave a good feeling to students and trainers, which leads them to attend to the course. And they stated that they helped them pay attention. As a result, UDL could be used to increase the attention of students in primary school mathematics courses.

The students stated that UDL increased the interest of students. In this study, it was possible to say that it was effective to work on the way to address the needs of each student in order to overcome learning variations and to offer alternatives in representation. This could also be understood from student expressions that providing options for recruiting interest served to achieve the UDL's principle of providing multiple means of engagement. This principle relates to affective networks. The types of affective reactions may vary from person to person, even over time and different situations in which the person is (Meyer et al., 2014). In addition, individuals are engaged in knowledge and activities that are relevant and valuable to their interests and goals. For these reasons, it is important to find alternative ways and to find ways of reflecting important and individual differences between students to attract students' attention (CAST, 2018).

Given information provided, it was concluded that the courses according to the UDL are aimed to be implemented in accordance with the principle of providing multiple means of engagement. Smith (2008) found that there was a positive relationship between student engagement and participation when faculty members used UDL strategies and technologies in their classrooms. Courey, Tappe,

Siker and Lepage (2013) found that an UDL increased awareness of prospective teachers to evaluate their interests. Walker, McMahon, Rosenblatt and Arner (2017) explained that
educators could create engaging lessons that enhanced accessibility for all learners, including those with special needs, by combining increased reality with UDL principles. As a result, UDL could be used to increase the interest of students in primary school mathematics courses.

The results of this study indicated that the courses based on UDL to provide multiple representation. It was seen that variability was achieved in three networks of UDL and thus in three principles related to these networks. Staulters (2006) determined that the presentation of digitized word problems in various ways, such as painting, orientation and clues, increased the students' performance, participation and self-efficacy in a mathematics course. Izzo, Murray and Novak (2008) had shown that the application of UDL in higher education was suitable for both faculty and managers' increasing diversity of higher education and the need for multimodal education.

Taking into consideration of student differences also served multiple representations. It was concluded that this was applied in the study. Because it was attempted to reach the whole class and options were provided to understand and show the subject. Rao and Meo (2016) stated that the use of UDL so as to develop inclusive lesson plans for all students with and without disabilities would increase opportunities for all students to reach the same high standards. As a result, UDL could be used to provide multiple representations in primary school mathematics courses.

The students' statements indicated that UDL increased cooperation between students. It related to the UDL's principle of providing multiple means of action and expression that students chose
the works they wanted to do together with their friends, communicated with each other during the study and helped each other. This principle is associated with strategic networks. Students may vary in terms of their ability to implement higherorder strategies such as planning, organizing, monitoring progress, developing alternative
approaches, and seeking help when needed (Meyer et al., 2014).

In addition, the group work activities also served the principle of providing multiple means of engagement. According to UDL, it is necessary to foster collaboration and community in order to ensure that students sustain efforts and persistence. The organization of peer counseling can increase opportunities for students for one-on-one support. When carefully structured, such peer collaboration can significantly increase the support available to maintain participation (CAST, 2018). Kitanosako (2012), the application of UDL in primary mathematics courses in Japan, found that focusing on good balance for facilitating group dynamism had a positive effect on students. As a result, UDL could be used to increase the collaboration skills of students in primary school mathematics courses.

The one of principles of UDL is to provide multiple representation. It could be concluded from the students' statement that UDL increased the retention of knowledge. It was seen from the student expressions that the activities such as repetition, rhymes and bodily movements, exercises that were appropriate to the student level were effective in providing retention. In addition, the students said that they could do what they learned at home without help was an indication of this. The activities involving the rhymes and bodily movements were used to highlight the critical features and relationships of the subject. Nelson (2014) stated that it was necessary to emphasize the critical features and relations to bring preliminary information from the recognition stage to the usage stage. Emphasizing critical features and relationships is used to provide the principle of representation of the UDL. Although this principle was related to recognition networks, it showed that students did not forget to express this information despite the time elapsed. It was seen that this information was transferred
from the recognition stage to the usage stage with the appropriate activities and studies related to the subject. As a result, UDL could be used to ensure retention in primary school mathematics courses.

The multiple participation is important component of UDL. The students in the experimental group stated that they had the chance to engage in the
lesson actively. It is critical in order to design learning environments that provide flexibility in the areas of participation, persist in the face of difficulty or failure and continue to develop selfknowledge so that each student can find a suitable path in the learning experience (Meyer et al., 2014).

Ensuring active participation in this study showed that UDL had been carried out to achieve the principle of providing multiple means of engagement. McGhie-Richmond and Sung (2012) found that UDL was a supportive framework to ensure the continuity of student participation through successful adaptations of teachers.

McGuire-Schwartz and Arndt (2007) found that UDL principles improved student learning and participation in meeting different student needs and making education more inclusive and effective. Staulters (2006) determined that the use of digitized word problems including pictures, orientation and clues increased the participation of students who had difficulty in solving vocabulary problems in mathematics. As a result, UDL could be used to ensure effective participation in primary school mathematics courses.

The self-regulation is one of the principles of multiple means of engagement. It was observed that UDL increases self-regulation skills. UDL allows students to make self-regulation. One way to ensure engagement in UDL is also to provide options for self-regulation. A successful approach requires students to provide very different skills to successfully manage their skills and the impacts of these skills and to provide adequate alternatives to support students with prior experience (CAST, 2018). Students gained self-regulation skills to measure their behaviour and their learning, to take responsibility for their own learning (Meyer et al., 2014). Yuzlu and Arslan (2017) found that UDL was more effective in developing students' self-
regulation skills than traditional teaching in English teaching. Lastly, it was concluded that conducting self-regulation skills related to affective networks positively influenced students' motivation and participation in the course and increased selfefficacy levels. He (2014) had shown that encouraging UDL through online lessons could reduce learners' concerns and support perceived satisfaction. Davies, Schelly and Spooner (2013) concluded that program-based UDL integration of
higher education students increased self-efficacy. As such, UDL could be used to increase the selfregulation skills of students in primary school mathematics courses. As a result, UDL is thought to be one of the effective methods in mathematic courses and its use is recommended.

This study was carried out in the $4^{\text {th }}$ grade mathematics course. UDL can be applied at different teaching levels or in different courses. In this study, the effect of UDL model on academic achievement and attitude was examined. It can be investigated whether this model has an effect on other dependent variables. In addition to these, the suitability of educational programs and learning environments to the UDL can be investigated. Teachers' opinions about UDL can be obtained.

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## A Case Study of Teaching Addition and Subtraction to a Student with Dyscalculia


#### Abstract

In this study, it was aimed to teach the addition and subtraction to a student with dyscalculia who is in third grade at elementary school. Before preparing individualized program, the student was given a pretest to measure about his level of the subject. The instruction was carried out in a room in the school, with a time of 40 minutes per day in the form of individual instruction with the student. In addition, the study was supported by a researcher-developed scenario booklet, concrete materials, computer games, reinforcement award, and assignments. This study was conducted as a case study, one of the qualitative research methods. The data were analyzed by descriptive analysis technique. Results of the study indicate that the student achieved more than $90 \%$ objectives on teaching basic addition and subtraction skills at the third grade. Gains have been actualized by the student with mathematic learning difficulties with over $90 \%$ success in 63 individualized lessons. On the other hand, social validity data were collected through observation and interviews to identify strengths or weaknesses and changes occurring in the student work. As a result of the studies, it has been determined that the student gained selfconfidence by enjoying his sense of accomplishment.


Keywords: Dyscalculia, mathematics learning disabilities, teaching addition and subtraction

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## Introduction

It is impossible for all individuals to benefit from general education in the same way, time and efficiency. Different teaching methods and applications need to be employed for different individuals. Those are the individuals who require special education. Special education is the part of general education system that are provided to students with disabilities in cognitive, behavioral, social-emotional, physical and sensory areas and they are individually planned and aim to maximize the possibility of individual's living independently (Eripek, 1998). Individuals with special education needs are classified by Turkey's Ministry of National Education Special Education Services Regulation (MONE, 2006). Classifications are made according to the common characteristics and educational needs of individuals, although each individual's needs are unique. One of these classifications is specific learning disability for particular subject. Based on DSM-5; it is a disorder that is validated with valid personalized success measurement tests and comprehensive clinical evaluation and is diagnosed when individual's learning and school skills are significantly and measurably less than expected according to the age of the person (Köroğlu, 2013).

According to the Special Education Services Regulation; an individual with specific learning difficulties is defined as a person who is in need of special education and supportive education services due to difficulty in listening, speaking, reading, writing, spelling, paying attention and mathematical operations. In fact, this disorder arises in one or more of the informational processes which are necessary to understand and use the language in written or verbal language (MONE, 2006). DSM-5 criteria are used in the diagnosis of learning disability in Turkey. In DSM-5; Learning Difficulties in schools are defined in three subgroups as reading disorder (dyslexia), numerical (mathematical) disorder (dyscalculia) and disorder of written expression (dysgraphia) (Köroğlu, 2013).

Difficulties with counting, learning number facts, doing mathematical calculations, telling time, counting money, measurement, mental math and
problem solving strategies are called as mathematical difficulties (dyscalculia) (Cortiella \& Horowitz, 2014). Students who have learning disabilities (dyscalculia) in mathematics have difficulty in daily life because they have difficulty in using quantities such as money, time and direction. They do not understand the prices and their efforts to calculate products' total prices in their daily shopping. Using hand and finger for calculation of prices may embarrass them publicly. The complexity of mathematical processes made it difficult to define what it means to have a mathematical learning disability (Geary, 2003).

Although there are many definitions about dyscalculia, dyscalculia in the most general sense is the defect and inability to recognize and use mathematical relationships, and to recognize, use and write numerical symbols (Butterworth, 2003). Researchers (Chinn, 2004; Dowker, 2004, 2005; Gifford, 2005; Hannell, 2005) emphasize that mathematical difficulties are often associated with problems in other areas, and that mathematical skills should be considered together with the difficulties associated with language, spatial orientation and memory (cited in Dowker, 2009). Geary (2004) explained that the difficulties experienced by students with dyscalculia include: dividing items into subgroups, estimating, remembering the concepts of numbers, counting down, understanding and applying the concept of time, money, sorting, finding the direction (left/right), recognizing number models and understanding and applying the language of mathematics. In addition, children with mathematics learning difficulties have difficulty in performing simple arithmetic operations (Shalev \& Gross-Tsur, 2001) and using recall based procedures to solve verbal problems.

It is viewed that teaching mathematics is very tough subject for students in all level in every society. Besides that, some students really experience mathematics learning difficulty for some reason even though they do not have any mental problems. Although $40 \%$ of students have difficulty in mathematics, dyscalculia is about 4 to $6 \%$ of the population (Beachman, Trott, 2005).

Butterworth (1999) stated that approximately 10 \% of the population is dyslexic.

In DSM-5, it is reported that learning disability in school-age children with different languages and cultures are between 5 and $15 \%$, and the reading disorder is between 4 and $9 \%$ and mathematics disorder is between 3 and 7\% (Köroğlu, 2013). It is stated that the students who have mathematics learning difficulties are about two years behind their peers and one year behind their peers in terms of working memory capacity during learning mathematic strategies used to solve simple ( $4+3$ ) and complex $(16+8)$ addition operations (Geary, Hoard, Byrd-Craven, \& De Soto, 2004). Students with learning difficulties in mathematics generally use underdeveloped calculation strategies such as finger counting when performing calculations. One of the issues related to early mathematics skills is that children can perform addition and subtraction procedures quickly by the way of recalling without calculation. This is the ability of automaticity. In general, $50 \%$ of children without learning disabilities who are in the 3rd grade gain automaticity rapidly. However, students with learning disabilities can improve automaticity later than other children (Bender, 2014).

Children with specific learning difficulties also face emotional problems as well as academic failures. Learning disabilities can lead to a decrease in children's self-confidence and an increase in anxiety and stress levels. As declared in DSM-5, specific learning disorder can have negative functional consequences through lifetime, including lower academic success, higher rates of high school dropout, lower rates of postsecondary education, high levels of psychological distress and poorer overall mental health, higher rates of unemployment and lower incomes (Köroğlu, 2013)

For all students with mathematics learning difficulties or normal development, it is necessary to determine the deficiencies in mathematical skills, to investigate the causes of these problems and to propose solutions for these reasons as mathematics is one of the prerequisite skills for all academic life. In fact, the main aim of this research is to examine how a student with mathematics
learning difficulties acquires the addition and subtraction skills and to demonstrate the knowledge and skills of the student before and after the study.

## METHOD

In this study, an intrinsic case study from qualitative research methods was used. In an intrinsic case study, the researcher is primarily interested in an understanding a specific individual or situation. The particulars of the case in order to shed some light on what is going on and study a particular student to find out why that student is having trouble learning to read and count (Fraenkel, Wallen \& Hyun, 2012).

This research was carried out in an elementary school of the ministry of national education in one of the central districts of Konya Province in the second term of 2016-2017 academic year. The school where the research was conducted was chosen since the researcher was working as the deputy director of that school. This study is a single-case research consisted of a student with a dyscalculia report. While selecting the student, the researcher had previously interviewed the school counselor and decided that the participant would be a primary school student in the third grade to teach the addition and subtraction. The researcher first found the names of the students who had mathematics learning difficulties in the third grade. The reason why the student was selected from third grade is that in the first and second grade curriculum, addition and subtraction are composed of basic knowledge and skills which are not complicated. On the other hand, it was thought that it would be too late to teach addition and subtraction in the fourth grade.
It was also noticed that there were different students with mathematics learning disabilities in the same class. First, five third grade students with mathematics learning disabilities were interviewed. It was determined that two students knew the addition and subtraction procedures (addition without-regrouping and subtraction without- regrouping tens). It was decided that the study would not be able to work with these two students as they should have no knowledge of addition and subtraction for the study. Among the other three students, two students who were in the
same class and having a learning disability report were found to know single digit numbers and two digit numbers, but they weren't able to write and read three digit numbers and could not do addition or subtraction. It was decided that one of the students in the same class would be the student to be selected for the subject of this study.

The student's class teacher was interviewed and his approval was received. The teacher said that the parent of the student had only visited the school once or twice in three years. The teacher's communication with parent was only carry out by phone in case of need. The parent's permission for this study was obtained by phone firstly and then the permission form was signed by the student's father when he came to meet with the researcher before studying.The student's personal and academic status was determined by the way of individual interviews with students, classroom teachers, school counselors and parents by the researcher. Information about the student which was formed according to the interviews is given below: The real name of the student was not used and labeled as ALP.

ALP: He was a 10-year-old male student and was born in Konya. He studies in the third grade. He came to his present school and class at the beginning of the second grade. He changed two teachers before. He did not have any developmental problem such as speaking or walking. He attended the preschool and loved it. He also learned how to read and write on time. However, his writing was very complicated with incomplete sentences and included many mistakes. When he first came into the class, he was frequently hiding himself under the desk. Despite the persistence of the teacher, his family, and the efforts of the school counselor, he did not sit on his seat like his classmates during classes. However this problem disappeared by the third year. He liked watching cartoons, playing computer games, and playing soccer very much. His father was a truck driver, his mother was a housewife. The family's socio-economic level was mediocre. He had a brother who was in the second grade in elementary school and a two-year-old sister. Since he still had a big trouble in mathematics class in the second grade, the school counselor directed
him to a psychologist and thus he was diagnosed as a student with learning disability. His mother had never sent him to special education and rehabilitation centers since she did not want him to be labeled as a mentally disabled person by the community. She took care of all his school relations.

## DATA COLLECTION PROCESS AND STEPS OF CASE STUDY

Data triangulation was employed to ensure the reliability of the research, and interview, observation and document review techniques were used at the data collection stage. Observation notes were kept while the studies were carried out with the student. In addition, the status of the student in physical education and mathematics classes was observed and recorded. The student was asked to draw a picture of his family and himself in order to have information about the value given to the concepts of parents and siblings by him and their psychological status in family relations. His drawing was interpreted by a teacher who had a certificate of Analysis of Children's Picture. In addition, semi structure interviews were made with the student's parents, teacher and classmates. Those interviews were recorded, transcribed and analyzed. After every day studying with the student, notes were reported about the developments into the research journals.

The course hours, goals and activities to be performed during the study had been determined beforehand and the study was performed within the scope of that pre-prepared program. The application part of the study was carried out completely by the researcher. Individual studies were conducted with the student. In the last three courses, the student was tested with mixed exercises. Firstly, the student was subjected to a preliminary examination and his knowledge of mathematics was tested. In this preliminary examination, firstly, the student was asked the basic information about the addition and subtraction which were expected to be known already. In this level, it is necessary for the student to know the values of numbers, the concept of size of numbers, the writing and reading of numbers (up to three digits), which are the basic skills for addition and subtraction. With the help of the
questions asked to the student, it was realized that the student had no knowledge about the value of the digits.

The student ranked the single-digit numbers in terms of their value. However, he did not succeed in the ranking of the double digit numbers. In addition to not being able to read and write three digit numbers, he also made mistakes in reading and writing two digit numbers. He was unable to add up the numbers when his fingers were not enough to count (the numbers whose results were higher than 10 in total) and he was unsuccessful in subtraction when his fingers were not enough.
According to the results of this preliminary test, it was determined that the basic skills required for the student to carry out the addition and subtraction calculations from first to third grade level such as values of numbers including threedigit numbers (hundreds, tens, and units digits), how to read and write numbers including threedigit numbers and how to order numbers including three-digit numbers from smaller ones to the bigger ones or vice versa.

Therefore, these basic skills were primarily included in the study program, which were necessary for addition and subtraction. Then, addition without-regrouping, addition with regrouping, subtraction without-regrouping and subtraction with regrouping tens and hundreds operations were taught respectively. Studies were also supported with concrete materials, computer games, reinforcement awards and assignments. The mistakes made by the student were determined after each lesson and those mistakes were taken into consideration while planning the next lesson. After the learning level of each skill had reached to at least $90 \%$ success, the next skill was started to be taught.

At first, the study started with natural numbers. The student who learned the concept of digit values easily read two-digit and three-digit numbers and managed to establish relationship between numbers in terms of their values. Since it complied with the Ministry of National Education's 3rd grade mathematics curriculum of the elementary school, operations with numbers up to 3-digit were included in the program. While the
students who had normal development were expected to learn these goals at $93 \%$ in lessons, the students with mathematics learning difficulties learned them with success by over $90 \%$ in 63 lessons at individualized curriculum.

The student with mathematics learning difficulties who learned numbers up to 3-digit was then introduced to addition without-regrouping operations. In order to better understand the concept of addition, the teaching process was supported with abacus and concrete materials. Carpenter and Moser (1984), examined the different strategies used by children with normal development to solve mathematical problems about addition and they mentioned about 3 strategies which were counting all, counting-on from larger and recall (retrieving the added numbers from long-term memory by regrouping). While using the counting-all strategy, the union of the two sets is counted by using physical objects or fingers until counting up to total result. Although it is the most commonly used strategy, it does not work for additions with numbers larger than 10 because that strategy requires using the fingers of a hand. At this point the counting-on from larger strategy is more favorable than the previous one; it requires saying the larger number in the problem first and counting the smaller one on it. With this strategy, students learn to start counting with the largest number, so they gain time. The last strategy in the addition requires the use of long-term memory and allows the results to be achieved by keeping the numbers in mind. In this strategy, with repeated practice and empowerment, the student memorizes the basic facts and uses them when necessary. For example, the student memorizes the $4+5=9$ problem over time.

The researcher thought that teaching ''counting-on from larger strategy'" to the student who was incompetent with addition would be the most useful thing and he created a scenario including that strategy. The student would gain the ability of carrying out operations more easily by this way and with the help of the scenario developed by the researcher. In fact, using this strategy help the student be able to do addition operations without using any concrete material. The researcher
created a small scenario book by drawing and painting pictures. With the strategy of "countingon from larger" addition without-regrouping, addition with regrouping, subtraction withoutregrouping and subtraction with regrouping tens and hundreds skills were easily acquired by the participant student. The scenario book consisted of 5 pages. During the adaptation period, the scenario firstly encouraged the student to use his fingers while performing a mathematical operation. In this scenario, the steps of the required addition operation were:

For Example;
6 (larger number is in our pocket)
+3 (smaller number is on our hand)
While carrying out the addition, we say that we should put the larger number into our pocket since it is heavy and we cannot hold it anymore. We hold
the smaller number, i.e. show the other number (smaller one) with our fingers. We add the number on our hand to the number that we have in our pocket. We start counting on from the larger added in the problem. For example, we hit our pocket and say " 6 ". We count on by showing our fingers " $7,8,9$ ". The answer is 9 . If the numbers are equal, we hold one of the numbers by hand and put the other one into our pocket. While we count-on from the number in our pocket in an addition operation, we count down the number in our pocket in a subtraction operation. This method made it more enjoyable to acquire mathematics operation skills and it provided convenience to the researcher and the participant student as it might be used for the further applications.

The scenario booklet created by the researcher is as follows:

Figure 1. The scenario booklet created by the researcher



Ali decides to add the numbers to each other. First, he gets the numbers in the balloon below. But the larger number is too heavy. That's why he puts it in his pocket first. He holds the smaller number on his hand. That means he shows it with his



He tells the larger number (5) and hits his pocket in order to make sure that the larger number is in his pocket. Then, he counts on from the larger number in his pocket by using the numbers on his hand. He counts " $6,7,8$ ". The answer is 8 . Let's add the numbers in the other balloons with the help of the same method. Let's help Ali reach his kite.


## FINDINGS

## FINDINGS RELATED TO COUNTING SKILLS

The operations and skills in mathematics are consecutive. That means learning an operation or skill requires learning the concepts or skills that precede it. In the process of editing the content of
mathematics, it should be taken into consideration that concepts, skills or processes are prerequisites of each other (Yıkmıs, 1999). In this study, the student's knowledge of numbers was measured first in order to have the student with learning difficulties gain the desired math skills.

Figure 2. The student's preliminary knowledge of numbers


Figure 3. The student's knowledge of numbers after the practice


## FINDINGS RELATED TO ADDITION

After the student with mathematics learning difficulty had acquired the necessary skills to carry out addition without-regrouping and addition with regrouping operations appropriate to the level of 3rd grade, addition operation skills began to be taught. Firstly, it was aimed to have the student understand the meaning of addition exactly. For this purpose, it was aimed that the student understood that addition is an incrementation operations and the student carried out addition calculations by using an abacus. After the student had understood the logic of addition, a method for addition operations (put the larger number into your pocket and hold the smaller number on your hand) was taught to the student with the help of a scenario developed by the researcher. As a result of this process, it was determined that the student achieved a success of $90 \%$ in addition withoutregrouping and addition with regrouping operations.

After the student with mathematics learning difficulty had acquired the necessary skills to carry out addition operations appropriate to the level of 3 rd grade, problems related to addition process were studied. Although the student had sufficient automaticity on addition operations, he was insufficient for understanding the problems and determining the order of the operations, so some of the problems were explained to the student by the researcher by drawing the visuals. After understanding the problems, the student solved them himself by using his skills. As the main purpose of the study was to teach the skills of addition and subtraction to the participant student, the researcher did not carry out any additional activity to have the student with learning disabilities understand the problems. Figure 3 shows the student's ability of addition before the practices, and Figure 4 shows the student's ability of addition after what had been worked on.

Figure 4. The student's addition performance after the practices


Figure 5. The student's level of addition skill after the activities


## FINDINGS RELATED TO SUBTRACTION

After the student with mathematics learning difficulty had acquired the neccessary skills required for the addition operations sufficiently, concrete materials (abacus, floor blocks, etc.) and visual images were used in order for the student to comprehend the logic of the subtraction operations. The visual picture drawn by the researcher was used to explain the difference between addition and subtraction. According to this picture, the addition is represented by a girl who collects flowers into her basket and increases the number of her flowers; the subtraction is represented by the girl who puts her flowers from the basket back to their place and decreases the number of her flowers. In order to perform a subtraction operation, the minuend must be bigger than the subtrahend. The researcher explained this situation with the help of a picture showing that as a big man can't get out of a small size door, a larger number cannot be subracted from a smaller number. This picture was also drawn by the researcher. It was determined that the student with learning difficulties understood the subject more easily thanks to these pictures.

In order for the student with a learning difficulty to understand that subtraction is a decreasing operations, the student peformed subtraction operations with an abacus. Afterwards, it was tried to be taught the student subtraction by counting backwards and using the regrouping techniques which had been learned by the student for addition During this lesson, it was seen that the student was
insufficient in counting backward, and so counting backwards exercises were performed.

After the student had acquired the ability to count backwards, it was seen that the student achieved over $90 \%$ of the objectives in the subtraction without-regrouping and subtraction with regrouping operations which were appropriate for the levels up to 3rd grade by using the "in my pocket-on my hand" technique. Mixed exercises were carried out in order for the student to differentiate between subtraction with regrouping and subtraction without-regrouping operations.

The problems including both addition and subtraction operations were studied with the student after he had learned how to carry out addition and subtraction operations. The student had difficulty in understanding some problems and determining the order of the operations and those problems were explained by the researcher to the student. After understanding the problems, the student solved them himself. As the main purpose of the study was not to improve the student's comprehension of the problems, the researcher did not carry out any additional activity to have the student understand them.

During the last three study hours, the student was tested with mixed (addition-subtraction) operations and it was found that the student achieved over $90 \%$ of subject. Figure 6 shows that the student had no knowledge of the subtraction operation while Figure 7 shows the student's ability of subraction after the practices.

Figure 6. Preliminary knowledge of the student about his subtraction skill


Figure 7. The student's level of subtraction skill after the practice

ONLUK VE YÜZLÜK BOZARAK ÇIKARMA İ̧LEMi
Aşağıda verilen çıkarma işlemlerini örnekteki gibi yapınız.


Figure 8. Mixed problems from the latest session of the practice

$$
\begin{array}{r}
10 \\
188 \\
=135 \\
\hline-73
\end{array}
$$

$$
\begin{array}{r}
16 \\
682 \\
7870 \\
\hline 692
\end{array}
$$

$$
\begin{array}{r}
1 \\
346 \\
+\quad 273 \\
\hline 619
\end{array}
$$

$$
\begin{array}{r}
31 \\
+135 \\
\hline 4614
\end{array}
$$

$$
2 \text { yenlis }
$$

Social validity data were collected by having interviews with the student's parents, classmates and class teacher about strengths and weaknesses of the research and the changes that occurred in the student and by observing the student's math and physical education lessons.
After the interviews with the student, his parents and the teacher, it was found that the student had difficulty in learning or weren't able to learn at all due to his learning difficulties. This situation caused the student to be excluded by his friends and labeled as a lazy boy. At the first meeting with the student's parents, it was stated that ALP wasn't able to understand the subjects since he had mental problems and his performance related to subjects was very bad. At the end of the study, the student's parents expressed that their son learned how to do addition and subtraction operations although they hadn't expected it to happen.

At the first meeting with the student's teacher, the teacher thought that ALP was not able to learn since he had some mental problems. Then, the mathematics operations and work sheets done by ALP were shown to the teacher and ask about them. He was amazed at the level of ALP, and said that ALP was no longer passive in the mathematics class. Moreover, the teacher stated that ALP was more engaged in mathematics lessons and he could perform addition and subtraction at the level of his friends.

At the first meeting with the student's friends, one of his friends R.A. described him as socially incompatible and a lazy boy. He said that ALP, who had learning difficulties, could not succeed in lessons because of not studying. In the meeting after the practices, the samples of the activities which ALP could do were shown to student R.A. and he was asked about ALP's performance in mathematic skills. At first, R.A. was surprised and said that ALP could learn, and sometimes he saw him doing his assigments during breaks.
In order to understand the mental state in his home environment, ALP was asked to draw a picture about his family and home environment. Children's drawings are an effective tool for reflecting children's observations, experiences, problems or ideas (Chang, 2005). The child's drawings are not only a criteria for identifying
children psycho-pedagogically, but also reflecting the mental capacity, personalities and inner world of children (Doğru and et al., 2006). In 1970, Burns and Kaufman developed the Kinetic Family Drawing Technique. In this technique, children are asked to draw a picture of their family including themselves. This picture aims to reveal the child's attitudes towards family and general family dynamics. Having children draw pictures of their family members can help experts who work with children understand children's social values and world views (Malchiodi,1998). For example, the father figure is often drawn as reading newspapers or doing some gardening, and the mother is always placed in the kitchen as preparing food for the family (Lee, Lim \& Chia, 2017).
In his family-themed picture, the student ALP drew himself while he was reading a book in his room. His father and two siblings play games in the children's room, while his mother works in the kitchen. According to him, his father is generally busy with a mobile phone and takes care of his siblings. The figure of ALP is in the lower part of the paper and is quite small.

## DISCUSSION, CONCLUSION AND SUGGESTIONS

It is possible to find lots of studies in which various methods were used to teach counting skills to the students with learning difficulties in mathematics. For example, Zerafa (2015) states that with appropriate interventions, students with mathematics learning difficulties can make progress in understanding the basic numbers. In Kaufman, Handl and Thony's (2003) research with six students with low mathematics performance, the students learned counting skills, symbols, addition, subtraction and digit values by means of the explicit teaching method in which manipulative tools (bead, counting bar, base ten blocks, etc.) were used. Browder, Jimenez, Spooner, Saunders, Hudson, and Bethune, (2012) developed a conceptual model in order to provide mathematical skills to the students with moderate and severe developmental disabilities.The student's performance in mathematical skills (counting groups of 5 objects, counting up to 10 by heart etc.) increased with the help of systematic clues and feedback-based instruction. Mononen, Aunio, Koponen and Aro (2014) investigated the studies on teaching early numeracy to the children
between 4 and 7 years with low mathematics performance. They emphasized that studies on early numeracy teaching focused more on explicit teaching, computer aided education, game-based instruction and teaching with concrete visual representations and these applications were effective. According to our research findings and other related research on this subject, it can be said that the student with learning difficulties in mathematics can acquire numeracy skills through appropriate interventions and appropriate teaching methods. For this student, firstly the appropriate plan and program should be prepared, physical conditions should be arranged and the teaching process should be planned by using feedback. It can be said that students who have learning difficulties should be given more attention and time in the teaching of numeracy.

In this study through a scenario developed by the researcher, addition skill was taught to the student with mathematics learning difficulty with the method of putting the larger number into a pocket and adding the smaller number on it by using fingers. The counting up from given strategy has also shown consistency with other studies: Baroody (1995) conducted a study on teaching addition to mentally handicapped and normal children. The teaching was designed as six separate steps. In the sixth step; the larger number was kept in mind, as many fingers as the smaller number were opened, and then the answer was found by counting on from the larger number. It was found that the application conducted in the last step was more effective for all the children to learn addition operations. Tournaki (2003) examined the effectiveness of test-based (memorization) and strategy-based (counting on from given) methods in teaching addition of single digit numbers to the normal students and the students with learning difficulty. While the normal student accelerated in addition with both of the methods, the children with learning disabilities gained faster results with the strategy-based method.

Although the student was able to perform the addition operations, he was insufficient to understand the problems and determine the order of operations. According to Olkun (2015), it was stated that students with learning disabilities
needed more concrete examples since they could not have the necessary cognitive and memory skills to solve multi-stage problems. Students with mathematics learning difficulties have difficulty in learning, understanding and remembering arithmetic operations (Shalev et al., 2001) and using recall procedures to solve verbal problems (Geary, 2004). Vassaf (2011) stated that these operations could be done correctly by the students with learning difficulties when the numbers that should be added or subtracted are told by someone else. However, those students cannot decide which operations ( multiplication, addition etc.) to do when they hear or read the problems on their own.

As a result, it can be said that the addition consists of three stages. In the first stage of the addition, with the help of the 3D objects, visuals, figures and concrete materials, it must be taught to the students conceptually that addition is an increasing and adding operation. After the student understands the essence of addition, the addition can be taught with the strategy of counting smaller numbers on from the larger numbers by using fingers. For the student with learning difficulties, these first two stages are important and need to be focused on. At the third stage, the student can now perform addition operations by using mental abilities. It might take a long time for the students with dyscalculia to reach the third stage. The student who is capable of addition is now ready to deal with mathematics problems. Students who have learning difficulties may have a trouble in organizing maths problems in their memory since they have cognitive problems. In this case, problem solving skills of the students with dyscalculia can be improved with the help of the strategies such as narration, storytelling, giving examples from daily life and drawing by using number bars, visuals, 3D objects etc.

In the teaching of subtraction operations, as in the operation of addition, with the help of the 3D objects, visuals, figures and concrete materials,it must be taught to the students conceptually that subtraction is decreasing operation. After the student understands the essence of subtraction, in order to subtract a number from another one, the strategy of counting backwards from the larger number to the smaller one by using fingers is
taught. After that, the students can now perform subtraction operations by using mental abilities on their own. It is possible to say that the students who have learning difficulties stay longer in this stage. As stated for the addition problems, students with dyscalculia have difficulty in understanding the problems, so it can be said that various strategies can be used to perceptually improve their problem solving abilities.

As a result of the interviews conducted with the student himself, his family and the teacher, it was seen that the student could not learn or had hardly learned because of his learning difficulties.This situation caused the student to be excluded by his friends and seen as a lazy boy. Many studies have shown consistency with these findings. Similar findings had been stated in some studies (Kabasakal, Girli, Okun, Çelik \& Vardarl, 2008), it was determined that students with special needs were not preferred to carry out a joint study by their friends and they were perceived as persons with compliance and communication problems.
The studies examining the relationship between emotional situation and cognitive success indicate that there is a positive relationship between depression and anxiety levels of children with learning disabilities. Children and adolescents with mathematics disorder have symptoms such as not going to school, skipping the school, and depression (Karabekiroğlu, 2012). Therefore, the development of positive problem solving skills in social areas also helps to cope with the lack of mathematical ability.

As a result of this study, it was found that the students with dyscalculia had difficulties in their social environment and daily life, those students acquired the gains of the middle school mathematics curriculum at a very low level and the teachers had insufficient knowledge about "Dyscalculia" (Hacısalihoğlu Karadeniz, 2013). The lack of guidance from parents at home and their exclusion from the society at school because of their low academic achievement may have led those students to experience depression. It can be said that if a student feels unhappy and alone in the family, this situation affects his social skills, academic achievement and communication with peers negatively.

During the research, ALP was asked to draw a picture about his family and home environment in order to understand his mental state in the home environment. When ALP described the picture he had drawn, he expressed that he loved his father very much, but his father didn't love him and he cared about only his siblings. The researchers state that the students show their mental state in their paintings when their family-themed pictures are taken into consideration. It can be said that the student is unhappy and alone in the family and this situation affects his social skills, academic achievement and communication with peers negatively.

To summurize the result of this study reveals that although there is a negative bias about mathematics by the students with mathematics learning difficulties, mathematics must be made attractive for those students by using games, rewards, concrete materials and fun activities. Besides, computer games specific to a subject can be used. Different types of activities that appeal to five senses can be carried out. If the lessons are based on the common grounds of students with learning disabilities and associated with everyday life, they can help them develop positive attitudes about mathematics. Teachers should not have negative thoughts for those students.

Individualized Learning Plans should be prepared for the students with mathematics learning difficulties before teaching the aims of the curriculum and the teaching process should be carried out in line with those plans. When teaching counting skills, the next goal should not be taught before achieving the objectives that must be learned first. The basic mathematical skills, which must be gained in order to carry out addition operations, should be taught as a priority. The basic mathematical skills, which must be gained in order to carry out subtraction operations, should be taught as a priority, too. The families of students with mathematics learning difficulties should take this situation seriously and cooperate with the student and the teacher in order to ensure an effective education for their children. Guidance should be provided to support those families. Since the participation of the students with
learning difficulties in an active social-cultural activity influences their self-concept positively, it will be beneficial to provide guidance services that direct these students to social-cultural activities appropriate for their interests and abilities.

Aknowlegment: This study was derived from first author's doctoral dissertation.

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## Gender Roles at the Vocational High Schools in Turkey


#### Abstract

The The purpose of this study is to investigate gender roles in vocational high schools. Hence, this study attempted to determine whether gender distributions in schools are influential in the gender roles of students. The sample included 423 students studying in five different types of high schools (vocational, health, multi-program, girls' vocational, and boys’ religious). The study was designed in the survey model. Bem's Gender Role Inventory was used to collect the data. The results of the research revealed the differences between sex and gender roles. In addition to that, there was a significant difference in the gender role ratios of male and female students, depending on the type of high school. To conclude, gender weight in the vocational school affects gender roles, primarily vocational high schools.


Keywords: Bem's gender role, coeducational schools, gender, gender roles, gender role inventory, vocational high schools

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## Introduction

Girls and boys socialise in different ways, with which they develop different gender roles in social life. The gender determination in adolescence has an impact on both preferences of profession and work behavior. In other words, gendered socialization of teenagers influences their choices in education and work. It implies the fact that people apply for different jobs by accepting their distinct gender roles. At this point, role and socialization theories consider that women prefer 'women's jobs' because they are more compatible with women orientations. The roots of this idea stretch through the dominant cultural and historical tradition related to women's role in raising children and care. Therefore, some would believe that they fit with these role requirements better than men's jobs. As a result, they argue that girls have tended to such careers as teaching, nursing, or part-time job opportunities. Although this argument has weakened over time, it has still been reproduced and maintained in various cultures (Alvesson and Billging, 2009, 13), especially by the education systems.

People learn to be girls or boys according to the gender-specific roles of society through internalising gender norms. At the same time, they create gender identity while they are growing up (Ryle, 2011, 133), and schools are primary agents in teaching and reinforcing cultural expectations for gender roles (Finn, Reiss, and Dulberg, 1980, 34; Lee, Marks and Byrd, 1994, 210). For example, the school creates masculinities through sports, peer culture, and discipline (Connell, 1996, 220; Stromquist, 2007, 6). Most of the gender construction in schools produces dichotomous about the meaning of being a man and a woman. Furthermore, the process of creating this construction continues throughout the education levels in schools. Nonetheless, most educational policies disregard the socialization role of schools (Stromquist, 2007, 30).

Gender roles often determine the traditional responsibilities and tasks assigned to men, women, boys, and girls (Ryle, 2011, 133). Accordingly,
individuals learn many associative networks of concepts throughout life and many potential cognitive schemata. So, society determines the importance of these schemas (Bem, 1983, 608). Also, school settings such as toilets might influence the students' role creation. In this sense, gender as a concept needs to be examined in great detail in schools.
However, little progress has been made on transformations in policy and practice from a gender perspective. Specifically, the literature focused on how schools shaped students' selfconcept and expectations. In general, the researchers examined gender socialization processes in the contexts of the formal curriculum, the teacher-based dynamics, the peer dynamics, the school environment, and the teacher qualification in schools (Stromquist, 2007, 30). So, we aimed to investigate the distribution of gender roles in different high types of vocational schools in this study. We hope this study contributes to the literature by exploring the dominant gender distribution of these schools.

## THEORETICAL FRAMEWORK

Gender refers to the behaviors, roles, attributes, activities, and opportunities that society assumes appropriate for girls and boys. Gender interacts with each other. However, it is different from the binary categories of biological sex (Lindsey, 2016, 4; WHO, 2019). According to Freud (as cited in Giddens, 2012; 213), being a woman or a man is achieved through identification, not biologically. Similarly, Connell $(1998,190)$ sees gender as an unfixed structure. He argues that personal experiences, social values, religious, economic structure, the social division of labour, or even the social atmosphere shape gender roles in society. Furthermore, Bourdieu $(2014,14)$ explains gender with the concept of social practice. From his point, the body is a concrete element of gender identity obtained through social experiences; therefore, it adapts to the measures determined by the society. As a consequence, it creates a new pattern like gender.

Gender roles point out to behavioral and social that are broadly aforethought to be socially proper for individuals of one particular sex within a specific culture. (John et al., 2007, 29). They are normative
because they are ideal behavioural expectations (Alvesson and Billging, 2009, 63) of the community. Gender norms are the sets of rules for what is appropriate feminine and masculine behavior in a specific culture (Ryle, 2011, 133). Similarly, gender identity refers to the way individuals consider themselves as male or female (American Psychological Association, 2011, 1-7; John et al., 2007, 2). In this context, gender indicates socio-cultural differences (Dökmen, 2014, 3-10) in a community.

According to Bem (1974, 158), gender roles do not include only masculine or feminine. Besides, they change in different situations. In other words, the individuals can behave feminine or masculine according to the circumstances, or can also develop different patterns of behaviour that involve high or low rates of both. On the other hand, Connell $(1998,190)$ associates gender roles with the concept of hegemony. According to him, the power developing with feminine and masculine sex roles constitutes a hierarchical structure. The hegemonic masculinity represents power. It appears at the top of this hierarchy and exerts pressure on both sexes to be more masculine. He mentioned two hegemonic influences based on this hierarchy that emerges in gender roles. In this regard, internal hegemony refers to the pressures of the sexes against their congeneric. At the same time, the external one points out the oppression of masculine identity towards the feminine. In this context, the exclusion of women who refuse to dress in "women style" or of men who wear pink shirts by their congenerics may be an indicator of internal hegemony. In addition to that, the pressures for being more masculine towards men who do not prefer to display behaviorsbehaviors specific to the male gender might also be an indicator of hegemonic masculinity. The analogy of the "stone oven man" may be an example of this pressure.

## GENDER SOCIALIZATION

Individuals learn gender roles in the process of socialization (Bhasin, 2003, 10), named gender socialization. Gender socialization is a multidimensional process that happens over time. People acquire gender norms and rules of society through that process. As a result, they develop an
internal gender identity (Connell, 1993, 599; 1996, 220; Ferree and Hall, 1996, 935; Stromquist, 2007, 4; John et al., 2007, 7-9; Ryle 2011, 120). According to the psychology perspectives, masculinity and femininity are not strictly biological (West and Zimmerman, 1987, 137). They are results of gender socialization that occurs through social learning, and children are not passive agents of socialization but have cognitive capabilities that allow them to process and internalise pertinent information (John et al., 2007, 9). The gendered meanings are constructed through processes of 'gender performance' or 'doing gender' during gender socialization. Doing gender means creating differences out of biological between girls and boys. Besides, once these differences emerged, they are used to reinforce the "essentialness" of gender. In other words, being a girl or a boy is being competently female or male, which creates female or male identity. Thus, new members enter in an automatic process through monitoring their and others' actions related to their gender implications in society. Children and adults always have to 'perform' or 'do' their masculinity or femininity (West and Zimmerman, 1987, 142).

The process of gender socialization is dynamic and changeable (Finn, et al. 1980, 35; Lee et al. 1994, 227). For the socialization models, individuals are not born with specific behavioural and personality characteristics but learn role expectations imposed by a particular society as sex roles through processes such as modelling, imitation, and applications of rewards and punishments (Sabbe and Aelterman, 2007, 522). However, at the same time, it has the autonomy to produce new and progressive identities (Apple and Weiss, 1986, 21; Stromquist, 2007, 6). Multiple institutions such as school, family, peers, social media, and new communication technologies influence gender formation of individuals. For example, schools simultaneously shape and are shaped by individual agencies (Bourdieu and Paseron 1990, 74-75; Giddens, 1979). Therefore, an essential aspect of gender socialization is the interaction between a single agency and social structural forces. Individuals reinforce gender identity by doing, producing, and reproducing gender-related practices every day. As a result, gender
performance, and gender socialization differs according to class, sexual identity, beliefs, cultural expectations, race, and other factors (John et al., 2007, 11).

Researches categorised gender roles according to the femininity and masculinity dimension until the 1970s. One of the recent theories to understand gender socialization was Gender Schema Theory, introduced by Bem (1981, 354-363, 1993). According to Bem (1983, 603-604; John et al., 2007, 3), gender socialization takes place as children assimilate their self-concept, way of thinking about themselves, to their gender schema. A schema is a cognitive structure or network, and it helps to organize and process information from the outside world. In this context, it helps to classify characteristics and behaviors as masculine and feminine categories and finally forms how to perceive the world around us.

## THE GENDER-SCHEMA THEORY

According to Bem's (1974, 155-161, 1981, 362) approach, the gender roles that emerge from these studies can be considered as traditional gender role orientations. In addition to these two gender roles, Bem $(1974,156)$ put forward the androgen gender role, which is outside the conventional gender roles. Androgens have attitudes that refuse to act according to gender stereotypes. According to this theory, gender schemas influence the information process of individuals and beliefs that direct gender-appropriate behaviors. So, children create a schema related to what men and women can or cannot to through observing their environment. For instance, a child raised in a traditional culture might believe that a woman's role is mothering or caring, while man's part is in work and industry. Besides, schemes determine the value and potential of people in that culture. For example, a girl raised in a traditional culture may believe that the only way for her as a woman is to marry and raise children. On the contrary, a girl raised in a more progressive culture may pursue a career and decide not to marry (Cherry, 2019).

Bem (1974, 155-161; 1981, 356; 1983, 608; HRF, 2019) offers four different categories into which an individual may fall into with her gender schema theory: Sex-typed individuals, cross-sex-typed
individuals, androgynous individuals, and neutral individuals. People who are sex-typed individuals will process and then integrate information that is consistent with their physical gender. The sextyped individuals process information and regulate their behavior according to whatever definitions of femininity and masculinity their culture happens to provide. In contrast, cross-sex-typed individuals treat and integrate information opposite to their physical gender. Besides, the androgyny implies the individuals' self-description of relative amounts of masculinity and femininity. The androgynous individuals process information and integrate traits that they find in both genders. Finally, neutral individuals struggle to process data from either gender. Bem (1983, 602-603) argues that gender schema theory is a theory of process, not content. When children learn the contents of gender schema in the culture in which they grow up, they also determine which attributes linked with their sex. In this context, genderschematic processing involves spontaneously sorting attributes and behaviors into masculine and feminine categories or "equivalence classes." According to the theory, individuals acquire their sex-typing by cognitive processing through the sex-differentiated practices of the social community. Therefore, nearly all societies teach the generation a substantive network of sex-related association as a cognitive schema at first. Secondly, they show the dichotomy between males and females intensively and extensively in every domain (Bem, 1983, 603-605), such as in schools.

## SCHOOLS AND GENDER SOCIALIZATION

The establishment of institutions or social relations with a sexist understanding emphasises the power relationship between sexual identities. In this context, the distinction between manspecific ve and woman-specific increases providing the basis for gender-based discrimination. As one of these institutions, schools are social environments in which gender and sexual identities are built, negotiated, and formally confirmed (Thorne, 1993; Stromquist, 2007, 20). Although sexual identity is developed based upon cultural practices and unconscious identification processes during adolescence (Redman, 1996, 178), schools have been accepted
as the critical cultural settings where sexuality is placed or discussed (Connell, 1993, 600; 1996, 220; Thorne, 1993; Redman, 1996, 181). Schools orient students to the behaviors that conform to traditional gender roles by conveying stereotypes of gender roles with explicit and implicit messages. Thus they reproduce gender inequality paving the way for gender discrimination. The arrangement of classrooms, toilets, playgrounds, the seating arrangement in classes, the kinds of duties and responsibilities attributed to students, expectations of teacher and school administrators following traditional gender roles, education programs, materials, and textbooks are all contained gender-discriminatory elements. This situation reproduces gender inequality through schools' hidden curriculum and influences students' preference of professions in line with gender roles (UNESCO Bangkok, 2009, 24). These arrangements are distinct, especially in single-sex schools.

One of the crucial functions of educational institutions is strengthening the shared values of society and improving the community. However, there are values causing problems such as genderbased discrimination in societies. Moreover, increasing violence against women, especially in developing or underdeveloped countries, reflects the gender understanding in these societies. For instance, stereotypes function mainly against women in a wide range, such as violence in the public sphere or being prevented from reaching senior managerial positions. In addition to the gender schemes, stereotypes reproduce and maintain primarily in schools, fostering gender discrimination against women. Stromquist (2007, 22) argues that the single-sex environment encourages stereotypical attitudes toward the other sex.

The rise of violence against women also suggests that gender is not addressed correctly and adequately in sociology teaching or through the hidden curriculum. However, the physical or psychological abuse reinforced by gender roles is one of the most critical subjects of both sociology and education, as it affects human relations and relationships between sociological institutions. Vocational high schools have an effective
mechanism in establishing gender roles following traditional patterns due to their single-sex structure. At this point, these schools would have adverse effects on students' social role identity formation and participation in employment in the future. In this context, repeated research on the role of schools in reproducing and promoting gender roles would guide effective measures in this area.

Studies have been examining the effects of prominent gender relationships on student behaviors in educational settings for years. They try to explain the construction of masculinity and femininity in the school settings (Stromquist, 2007, 28). For example, the findings of Lloyd et al. $(2000,126,127,136)$ showed that educators gave more advice to boys while they discouraged girls in school environments. Besides, they allow boys to harass girls in school environments. Similarly, Hilliard and Liben (2010, 1789) claimed that gender-based division reduces the opportunities for girls and boys in schools to work together for a specific purpose. Besides, they argued that teachers' attention to the sex of students led to gender-based grouping or spending less time with the other group.

Furthermore, Sancar $(2009,2011)$ pointed out that the emphasis on gender differences and maledominated culture are re-created by gendered male places such as boarding boys schools. The separation of girls and boys in schools is supposed to improve the academic performance of girls and boys. However, the effectiveness of single-sex schools depends on how they are organised and how the teachers are qualified to promote nonsexist environments (Stromquist, 2007, 23). The literature review (Datnow, et al. 2001, 184-206; Stromquist, 2007, 4-30) for single-sex schooling in the U.S. concluded that these schools provided stronger academic environment boys and girls rather than co-educational environments. Besides, girls' self-esteem and leadership engagement enhanced in math and science. Moreover, boys, especially low-income and minority students, gained more significant character development and educational achievements. On the other hand, Yolcu (2011) examined factors that affected the individual education demand for vocational high
schools for girls and gave evidence that gender role is the most influential factor in girls' choice of girls' schools. Moreover, Aslan (2007) concluded that studying vocational high schools has more effect on girls' preference in domestic role-like professions. Parallel to this, Yolcu (2012, 454480) studied the demand of student teachers to enter the of pre-school teaching in the context of perceptions of gender roles. He found that gender roles influence students' choice and motivation to become pre-school teachers. Besides, while the females want to work as teachers, the males aspire to leave the classroom after gaining some experience to become a school administrator or supervisor.

Moreover, Sarı (2011, 494-502), examined male students studying at a nursing college and found that these students perceived nursing as a profession compatible with feminine roles. In this study, students stated that they would have difficulty in the nursing profession because they are men. Also, some of the students indicated that they feel excluded because of the department they studied in society. Furthermore, Demir et al. (2016, 3), studied gender attitudes of 1643 students 3117 of which were girls and 1474 of which were boys high school students in 10 provinces in Turkey. The study revealed that vocational and religious high school students had more traditional attitudes compared to other high school students. These students indicated that women and men should have different roles and duties in society.

Finally, studies indicate the limitations of singlesex education regarding social relations. For example, Ferrara (2005, 2-8), Herr and Arms (2004, 547) and, Parker and Rennie (2002) mentioned that while student behavior improves in female-only environments, it negatively increases in male-only settings. Parker and Rennie (2002, $881,894)$ indicated that students were subjected to less bullying when they participated in all-girls classes than they were in coeducational classrooms. Moreover, negative behaviors were more shown in all-male classes. Similarly, Ferrara (2005, 2-8) and Herr and Arms (2004, 544-545) found more significant adverse reactions in allmale classes. Moreover, Spielhagen (2006, 69-71)
presented that more students reported bullying in all-male classes.

Furthermore, Crawford-Ferre and Wiest (2013, 301-312) examined the effectiveness of single-sex schools. They found that the most critical weaknesses of the single-sex-education were the lack of social experience with the other sex and increased behavior problems. They concluded that boys' behaviors were different in a coeducational class, which was the evidence of the lack of socialization.
It is clear that, for a better future in social life, determining whether single-sex schools are supportive or preventive is not only an educational problem but also a sociological, economic, and even ideological issue. In this context, researchers need to examine the reproduction of gender, especially in single-sex schools, over and over again.

## TURKEY, AS THE RESEARCH CONTEXT

There have been single-sex schools in Turkey since 1923. The names of these schools, which were girls' vocational high schools and boys' vocational high schools, were changed to vocational high schools in 2011. This change seems to aim to eliminate gender issues in education. However, gender-based practices have been continuing in these high schools up to date. For example, Çelikel Education Foundation prepared a noteworthy report on vocational high schools in 2015. The report showed (Çelikel Education Foundation $(2015,40)$ that the motivation of female students was low, they were unhappy, and they did not even want to go to school, because their number was few in these schools.

In another noteworthy study, Vatandaş (2007, 4344) found that gender perception influences the selection of the profession, and the participants differentiated occupations by gender. In this study, $94 \%$ of the female participants and $86 \%$ of the men revealed that the policy was suitable for men. Besides, the same rate of participants indicated that chauffeuring is fit for men, nursing, daily/cleaning, and secretarial work are ideal for women. Furthermore, Sayılan $(2012,63)$ pointed out that vocational and technical high schools
create a sexist division of labour. These studies are noteworthy in terms of showing the prevalence of sexist attitudes towards occupations in society.

There are 2,068,212 students 858.737 of which are girls and 1.209.475 of which are boys in vocational high schools in Turkey in 2017. However, there are $1,504,111$ girls and $1,632,329$ boys in coeducational high schools in 2017 (MEB, 2017, $122-123)$. As is seen, the ratio of girls and boys studying coeducational high schools is quite close to each other. In contrast, the number of boys is quite higher than girls in vocational high schools. According to Dollar and Gatti (1999, 20), a $1 \%$ increase in the share of women with secondary education improves annual per capita income growth by $0.3 \%$. However, women receive less vocational training than men in developing countries (ILO, 2010, 1). This reality produces a strong argument for investing in girls' professional education. In this case, the limited number of girls in vocational education is one of the indicators of economic issues as well as the negative academic or gender-based results in Turkey.

The Gender-based mentality education in vocational high schools reduces the rate of female students who prefer these schools in the country. Eren-Deniz (2014, 165, 187-189) found that the students in girls' vocational high schools frequently used the expression "befitting a girl." This study revealed that teachers gave positive grades to these students because of their characteristics, such as "respectful, dignified, docile, quiet, and calm." Besides, Ayas and Pişkin (2011, 550) indicated that industrial vocational high school students more bullied or overbearing than high school, and general high school students have determined that they exhibit behaviors. Furthermore, according to the EARGED (2008, 13) report, more than half of the teachers working in vocational high schools observed that their students were involved in violence outside the school.

This study aims to reveal the gender roles of the students in coeducational high schools, in male
vocational high schools, in health vocational high schools for female students, and religious high schools for male students. The research questions are as follows:

1. Are the gender roles of students related to their gender?
2. Do the gender roles of students vary according to the type of high school they study?
3. Do the gender roles of female and male students in different high school types vary according to the dominant gender distribution of the high schools they attend?

METHOD

## RESEARCH DESIGN

We carried out this research in quantitative design with a single survey, one of the survey models. Survey models are researches aiming to describe the sample. Büyüköztürk $(2013,231)$ states that survey models are more effective in answering descriptive questions such as "what, where, when." Karasar $(2007,77)$ says that the variables of a group, individual, event, institution, and situation are tried to be defined separately in the single survey model. In these models, certain features should be determined directly and following specific standards.

## POPULATION AND SAMPLE

The sample of the study consists of 423 students, 232 of whom were females, and 191 of which were males. The participants are studying ninth, 10 ., 11., and 12. grades in five different vocational high schools in Istanbul. We aimed to understand the effect of gender distribution in high schools on gender roles in this research. In this context, we determined the sample by random sampling method in single-sex schools and by proportional cluster sampling in the coeducational school. Through cluster sampling, we aimed to prevent the dominant gender in mixed schools from dominating sampling. The distribution of female and male students by high school types is presented in Table 1.

Table 1. High school types and gender distribution of participants

|  | Girls | Boys |
| :--- | :--- | :--- |
| Type of School | n | N |
| Multi-Programmable | 59 | 71 |
| Vocational | 29 | 44 |
| Health | 51 | 20 |
| Girl Occupation | 93 | $?$ |
| Religious | - | 56 |
| Total | 232 | 191 |

## INSTRUMENT

To collect data, we used the Gender Roles Scale developed by Bem (1974, 155). The scale includes two essentially uncorrelated scales that are masculinity and femininity (Payne, 1987). In the scale, the participant with high scores for both masculinity and femininity was defined as 'androgenic'. However, they who got low scores on both measures defined as 'undifferentiated' (Bem, 1977,197-203). Özkan and Lajunen (2005, 103110) shortened and adapted the scale to Turkish. This shortened instrument, as a 7-point Likert-type scale, has three dimensions and ten items. The first ten items indicate masculinity with the power, aggressive, and dominant features; the ten items indicate femininity with emotional, sympathetic, and understanding elements; and the last ten items show neutral items such as friendly, helpful, reliable. In Özkan and Lajunen's work, the Cronbach's alpha was .80 for masculinity and .73 for femininity for the male participants. On the other hand, the alpha was .80 for masculinity and .66 for femininity for the female participants in the same research. Besides, the factor structure yielded consistent results with the original scale dimensions of femininity and masculinity. In this study, Cronbach's alpha value of the women was estimated .83 for the femininity dimension and .70 for the masculinity dimension. The Cronbach's alpha value of the men was estimated .83 for the masculinity dimension and .90 for the Femininity dimension. These scores are consistent with the findings obtained by $\operatorname{Bem}(1974,159-162)$ and the results of Özkan and Lajunen (2005, 106). For the four sub-dimensions of the gender roles scale, we used the median value as a point of estimation, as Bem $(1974,155)$ and Özkan and Lajunen (2005, 106) did. In the data analysis, the median of masculinity scores was 48.0 , and the median of
femininity scores was 58.0. Accordingly, the median score above 48.0 points determined the feminine gender role of the participants, while the scores above 58.0 indicated the masculinity gender role. Also, the median score above both femininity and masculinity median scores was determined to show the androgen gender role. We applied these scores to determine the gender roles of male and female students in different school types.

## DATA COLLECTION PROCESS

We administered the scale to the participants in predetermined classrooms and out-of-class periods in 23 sessions in the sample schools. We informed the participants about the study and declared ethical considerations such as the anonymity of the data. Finally, we collected the data with the participation of volunteer students.

## DATA ANALYSIS

Firstly, we examined whether the scores obtained from the gender roles scale meet the underlying assumptions of parametric tests to determine the data analysis technique appropriate for the research. Tabachnick and Fidell (2013, 67-68), indicate that the scores show a normal distribution if the skewness coefficients of a variable are within $\pm 1$. According to the analysis, the skewness coefficient of the scores obtained from the Gender Roles Scale resulted in .172 for gender, .226 for high school type, and -.371 for gender role. Also, the kurtosis coefficients were -1.980, -1.291, and 1.129 in the same order. According to these results, the gender roles scale showed normal distribution in terms of school type and gender variables. As a result, we used the Chi-Square test to determine the relationship between students' gender roles and high school types.

## RESULTS AND DISCUSSION

Gender roles of the students related to their gender According to results, there is a significant relationship between students' gender and perceptions of gender roles at $\mathrm{p} \leq .001$ level ( $\mathrm{X}^{2}$ $=30.831, \mathrm{p}=.000, \mathrm{df}=3$ ) when we ignored the other variables.

## GENDER ROLES OF STUDENTS ACCORDING TO THE TYPE OF SCHOOL

The results revealed that there was a significant relationship between students' gender roles, and school types at $\mathrm{p} \leq .05$ level when we ignored the other variables (Table 2).

Table 2. Chi-square Test Results of the Gender Roles and Type of Schools

| School type | $\mathrm{X}^{2}$ | df | P |
| :--- | :--- | :--- | :--- |
| Vocational | 7.067 | 3 | .070 |
| Multiple programs | 13.309 | 3 | .004 |
| Health | 6.763 | 3 | .080 |

## THE DISTRIBUTION OF GENDER ROLES OF THE PARTICIPANTS IN SCHOOLS

The results showed that $33.3 \%$ of the female students who study in vocational high schools in
which mainly male students study had "feminine," and $23.3 \%$ had "masculine" gender roles (Table $3)$.

Table 3. Gender Roles Distribution by High School Types and Gender of Students

| School type | Gender | Gender role |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- |
|  |  | Masculine | Feminine | Androgen | Neutral |
| Vocational | Girl | 23,3 | 33.3 | 20.0 | 23.3 |
|  | Boy | 18.2 | 11.4 | 25.0 | 45.5 |
| Multiple programs | Girl | 9,8 | 27.9 | 32.8 | 29.5 |
|  | Boy | 18.3 | 5.6 | 33.8 | 42.3 |
| Health | Girl | 17,6 | 27.5 | 35.3 | 19.6 |
|  | Boy | 28.6 | 4.8 | 28.6 | 38.1 |
| Religious (Boys) | Boy | 25.8 | 11.3 | 35.5 | 27.4 |
| Girls vocational | Girl | 12.9 | 28.0 | 33.3 | 25.8 |

According to the results of the analysis, it is interesting that the masculine ratio of female students is higher than male students in vocational high schools. However, the high percentage of neutrality in the gender roles of male students in these high schools is significant.

Concerning the multi-program high schools, where gender distributions are relatively homogeneous compared to other vocational high schools, we found that both girls and boys have their gender roles. This result shows that in mixed schools where two genders are balanced, both sexes develop their gender roles more. Interestingly, according to the results, both of their
androgen scores were higher than the scores of their gender roles. Besides, the results indicated that these students see themselves as androgen, and as neutral rather than feminine or masculine. Similar to the multi-program high schools, we found that girls have feminine roles, and boys have masculine gender roles at a high rate in health high schools. Moreover, according to the results, these students see themselves as androgen, and as neutral rather than feminine or masculine. Another impressive result was related to religious schools, where only male students study. The results showed that the androgenic score of the boys in this school was higher than their masculine scores. Similarly, the androgenic rating of the girls in girl
vocational schools, where only female students study, was higher than their feminine scores.

## DISCUSSION AND CONCLUSION

## GENDER ROLES IN VOCATIONAL HIGH SCHOOLS

Results revealed that, although the androgen identity of boys and girls in vocational high schools was equal, the neutral gender role in boys was higher than that of boys in other high school types. The traditional gender role orientation of female students in vocational high schools is high compared to different kinds of high school. However, the traditional gender role of male students attending vocational high schools is low compared to the students attending vocational high schools and religious high schools. Among the high school types, the highest level of traditional femininity emerged in vocational high schools. The masculinity gender role scores of girls in vocational high schools are more elevated than female students in other high school types. Arsel and Batıgün $(2011,9)$ argue that the high rate of masculine gender role in girls increases resistance to difficulties. In this context, we conclude that the masculinity for girls might increase with the influence of male-dominant culture in vocational high schools. Demirtaş-Madran (2012, 73, 74) states that masculinity among female students in vocational high schools emerges with the effect of male grouping culture in these schools.

Moreover, Adams (1995) argued that androgen identity provides more benefits to young girls than young boys, mainly because of the masculinity it contains. The results revealed that the neutral gender role of male students in vocational high schools was highest among the high school types. We might explain this result with Connel's (1998, 190) concept of hegemonic masculinity, which points out the pressure environment that increases the tendency of power and violence. According to Türk (2015, 87-89), hegemonic masculinity and destruction are in a structure that produces each other rather than a simple extension of each other. Hegemonic masculinity contains violence, which is the source of both the external hegemony towards women and the internal domination towards men (Yarar, 2015, 5, 6). Pleck, Sonenstein ve Ku (1994) found that boys with a masculine
gender role were more likely to tend to problematic behaviors and harmful habits. The data in the press CNNTÜRK (2017) on disciplinary events in vocational high schools confirm the discourse of hegemonic masculinity in vocational high schools. In this context, we conclude that the high rate of the neutral gender role among boys in vocational high schools is significant compared to other gender roles. We concluded that boys in vocational high schools have tended towards the neutral gender role because of the difficulties of adopting the gender role based on the violence and violence created by the male-dominant culture. When we focus on Bem's (1983, 608-616) gender roles theory, vocational high schools are impressive in terms of the high rate of neutral gender roles and the low score of androgen gender roles of girls and boys and. Similar to these results, the research findings of the Çelikel Education Foundation $(2015,45)$ reveal that gender-based discrimination is an essential problem of vocational high schools.

## GENDER AND MULTI-PROGRAM HIGH SCHOOLS

In multi-program high schools where the number of female and male students is relatively equal, while the meagre rate of the masculinity for female students, and the femininity for male students, the androgen identity of both sex groups is quite high. Steinberg $(2007,327)$ states that less masculine boys and less feminine girls cannot be popular enough among their peers. They are also less accepted by peers of the opposite sex. In this context, the rate of popularisation in multiprogram high schools might be low compared to other high schools. The results revealed that the highest relationship between high school type and gender roles was in multi-program high schools. Students in schools may have developed gender roles that are compatible with their gender, as their gender is relatively equal.

## GENDER AND HEALTH VOCATIONAL HIGH SCHOOLS

According to the results, the highest traditional masculinity is in the health vocational high school. Hence, we can conclude that girls and boys tend to develop conventional gender roles when they are in predominate opposite-sex settings. The results
showed that the androgyny was high, and neutrality was low in female students in health vocational high schools. Male students have a little rate of femininity and a high level of uncertainty. Students are supposed to acquire values such as care, conscientiousness, empathy, and caring for the suffering of other people in health vocational high schools. In this context, the low level of and androgenic and feminine gender roles among male students is noteworthy in predicting their predisposition to the occupation in these schools.

## GENDER AND RELIGIOUS VOCATIONAL HIGH SCHOOLS

According to the results, the highest androgen identity is in the religious vocational high school. Besides, male students in these high schools have high masculinity and low femininity. Furthermore, these students have a high tendency towards traditional male gender roles. The "feminine gender role" ratio of male students in religious high schools is higher than the rate of students in coeducational schools, as it is in vocational high schools. We might explain this outcome by the socio-economic conditions of these students and the programs implemented in these schools. The study conducted by Timav (2016, 12-46) reveals that society expects students from religious high schools to be harmonious, dignified, respectful, and conscientious. Since the impact of social expectations and the "religious values that emphasise being good people" in the curriculum are compatible with the feminine gender role characteristics, the femininity of these students may have emerged at a high level.

## GENDER AND GIRLS VOCATIONAL HIGH SCHOOLS

According to the results, the rate of female vocational high school students' femininity roles was higher than of masculinity. Eren-Deniz (1999, 165) emphasises the enhancing effect of the hidden curriculum or the language used by teachers on the femininity of students in girl schools. Steinberg (2007) also states that girls develop a traditional gender role in high school, mainly because of the pressure to act compatibly with their gender, which increases their intensity with adolescence. Also, according to the results, although girls were relatively more masculine, the
female rate of boys was low. This result supports the argument that the male gender role is more widely accepted in society. Many studies (e.g., Frome and Eccles, 1996; Orr and Ben-Eliahu, 1993) show that western and non-western young men feel better in the masculine gender role than in androgyny.

Massad (1981, 1290) found that peer acceptance in adolescence was high in androgen girls and masculine boys. Also, Aydın ve Kavuncu (1993, 57) found that the neutral identity in boys is onethird, while Demirtas-Madran (2012, 73-74) found it in quarter rates. However, this research revealed that the gender role of neutral is higher than these results in boys, especially in all vocational high schools. Therefore, the hight rate of the neutral gender role in male students might not be explained with the identity complexity in adolescence, as Steinberg (2007) suggested. In this research, we found a significant relationship between gender and gender roles at $\mathrm{p}=.000$ level.
Schools create and maintain gender ideologies, leaving a narrow margin for the questioning and the reframing of gender beliefs and practice. Schools tend to mirror society. So, for schools to bring positive change to their treatment of gender, they would have to counteract social influences actively. Most of the attention to gender issues in education has highlighted the importance of access to schooling while ignoring the critical socialization process that takes place in educational settings (Stromquist, 2007, 28). Especially in terms of the students who are in the late in adolescence and have secondary gender characteristics (such as thickening of the voice, pubescence, increase in muscle mass) late compared to peers, one-sex schools may harm sexual development. Identifying these students in schools, especially in the types within the scope of the research, providing them with consultancy services and conducting preventive studies will support the gender development of such students. In this context, we propose to raise teachers' awareness of gender development and such students.Tansel (2017, 21-22) points out that vocational education contributes to girls more than boys. However, vocational high schools already give the impression that they are in sex-based decomposition. Moreover, some vocational high
schools are called girls' or boys' high schools, which results as a preventing factor for orienting students to these schools. Ignoring the gender distribution of the school in preference vocational high school will provide students with appropriate training for their abilities and interests. As a result, graduates of these schools will work in their fields where they trained. Thus the effectiveness of vocational training, which is quite costly, will increase. In this regard, we recommend enhancing the rate of policies to reduce the relationship between vocational high school and gender and to ensure that students' interests and abilities are valued more during the education process. In schools where only a type of gender is predominant, places such as social settings, classrooms, dining halls or toilets should be designed so that all gender identities can use these places without gender discrimination. Finally, we suggest to the researchers that they weight gender studies in vocational schools.

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## Bilingualism in Early Childhood: Code Switching


#### Abstract

The present study is aim to how bilingual children used another language as well as their mother tongue was explained on the basis of Bernstein's code theory. For this purpose, spontaneously bilingual children were examined in their natural environment and explained according to the Berstein's code theory. It also emphasized the importance of bilingualism at an early age. In this study, a case study as one of the qualitative research methods was used. Two bilingual children were observed and the observations obtained were noted by researcher. The code switching in between two children was examined and comapred according to the theory explained in the literature. According to the findings of the research one of the examples shows the positive effect of the use of code switching and the other shows the negative effect. The results of research has shown that the use of code switching, that is, allowing language switching, has a supporting role in children's acquisition of a new language.


Keywords: Code theory, multilingualism, early childhood, emergent bilingualism, native language acquisition

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## INTRODUCTION

It is estimated that about one-fifth of the world's population is bilingual or multi-lingual (Yıldırım, 2016; Diamond, 2009). In recent years, the number of multicultural and multilingual people in America has begun to increase (Brice \& Anderson, 1999). For example in the United States, the number of Spanish-speaking students has increased (Pollard, 2002). Like this A few languages spoken and understood in America began to spread in small-scale traditional societies. Likewise, in Turkey, the number of bilingual children has been increasing in recent years. These changes have led to new problems in the dominant language environment. The lack of an appropriate environment and school environment for children to use both languages has led to an inability to understand the language used, and as a result it has been misinterpreted by teachers and the environment.

There have been many definitions of bilingualism in literature. In general, bilingualism is the ability to express one's self easily and smoothly on two languages (Purcell, Lee, Biffin, et al., 2012). People often become bilingual because they need it in their daily lives. There is no need to be perfectly fluent in two languages, but the important thing is to have a dominant language and to be able to express oneself in both languages (Url 1). Bilingualism is divided into two as simultaneous acquisition and sequential acquisition.

- Simultaneous acquisition occurs when a child learns two languages at the same time. It consists of 3 stages. In the first stage, the child mixes two languages in a single system. In the second stage, they begin to separate words in each language from each other and understand which person speaks which language. In the third stage, a language is spoken more often than others, and it becomes more dominant depending on the frequency of use. Simultaneous language acquisition can be obtained in two ways. One person, one of the parents, or one of the family members uses one language another language. In the other model, parents or family members support by speaking both
languages (Purcell, Lee, Biffin, et al., 2012).
- Sequential acquisition is learning the second language after the first. This is a 3 -step process. In the first stage the child observes the second language speakers, at this stage s /he may remain silent, communicate by pointing and then the child starts to trust the sentence memory. In the second stage, the child communicates in the second language and begins to form his own sentences. In the third stage, he begins to speak using correct words, correct grammar, and correct pronunciation. When languages are learned sequentially, understanding the first language rules supports the development of the second language (Purcell, Lee, Biffin, et al., 2012).

Bilingual children's language acquisition and use processes are different from monolingual children. In this process, if the right support and environment is not provided to children, it may have many negative consequences. Children who just start using two languages, frequently switch between languages, namely code switching, by using words from both languages together. These transitions are seen as an important part of the language acquisition process. Richard Skiba says that code switching can be seen as an extension of the language for bilingual speakers (Skiba, 1997). Bilingual children have the ability to speak in both languages at different levels. While speaking a language, being fed by another language is an important process for bilingual language development. When two languages are spoken, reasoning and concept formation are better developed and advanced language skills such as code switching, accents, and syntax are obtained (Doron, 2014). At the end of age 3, the average bilingual children use two words for most concepts, thus gaining more experience of switching between languages (Crivello et al., 2016).

Code switching is something that bilingual individuals often do in environments where both languages are spoken. Code switching is defined as an alternation of two languages in a single discourse (Pollard, 2002). Child switches to another language while speaking fluently without
any hesitation. In this study, the role of code switching in two languages (both English and Turkish usage in the same discourse) was examined. The situations where bilingual students have code switching, its effects and whether it provides language freedom were explained on case studies.

## THE PURPOSE OF THE STUDY

In this study, how bilingual children used another language as well as their mother tongue was explained on the basis of Bernstein's code theory. The purpose of the research is to find out the role of code switching (both in English and Turkish use in the same discourse) children have while using two languages acquired in natural environments. The situations where bilingual students have code switching, its effects and whether it provides language freedom or not were explained on case studies. In addition, this study also showed how the use of code switching affects the examples in the case studies positively (the transition between languages provides more effective communication) and the negative (not allowed and not understood) effects. It also emphasized the importance of bilingualism at an early age. For this purpose, the following questions were asked;

1. Does bilingualism have any advantages and disadvantages? What are they?
2. What is code switching? What are its positive and negative effects?
3. When, why and how is code switching be used?

## SIGNIFICANCE OF THE STUDY

With the impact of globalization, bilingualism and multiculturalism have begun to spread to most countries in the World. The rapid progress of technological developments and the increase in scientific research have made it necessary to use a second language nowadays. In addition, the children of immigrant families had to be bilingual. The new generation has been exposed to a second language even if we do not want it. However, the acquisition and use of a second language, the processes of language acquisition, and critical age periods have been the topic of controversy for
many years. These debates have led to many definitions of bilingualism that have brought many misconceptions.
Recently, many studies have shown that the critical age in the acquisition of a second language is three years old, and learning another language at an early age provides many advantages for the child. However, the answers to many questions such as what kind of way should be pursued in this process, whether there should be a dominant language, whether other languages should be learned after the mother tongue is taught, how the language systems work and whether another language is based on mother tongue system has become important for teachers, researchers and especially for parents.
When learning a second language, children's mixing it with their mother tongue and their use of words from other languages in the same sentences creates worries in the environment if learning another language affects the use of mother tongue negatively. However, all these processes are normal for individuals learning a new language. The results of this research inform interested people as a strategy to help learning if bilingual students are allowed to use code switching. It also brings a new perspective to the misconception that children who change countries as a result of immigration fail in academically due to language inadequacy, and in this sense this research is a guide for parents and teachers of bilingual children. Besides, it highlights the importance of using a language other than mother tongue in early age.

## THEORETICAL EXPLANATIONS AND RELATED RESEARCH

The view that bilingual children are slower, disadvantaged and have less vocabulary rather than monolinguals until the 1960s has been changed by Peal and Lambert's (1962) study, and it was found out that bilingualism provides a cognitive advantage than monolingualism. In recent years, many variables have been researched in the studies. Accordingly, it has been found that even though bilingual and monolingual children have similarities in language acquisition process and cognitive domains, bilinguals have large
differences. One of them is selective attention in the prefrontal cortex developed in the first 5 years (Diamond, 2010).
Many studies have shown that cognitive processes are predominantly dependent on linguistic skills (Bialystok, Craik, 2009). As a result of the researches carried out, bilingual children were found to be more successful than monolingual children in the cognitive concession of linguistic processes. Accordingly, the fact that bilinguals have two or more words for an object or a concept allows them to look at events from a different perspective. As a result, it has been seen that the bilinguals are individuals with creative, openminded, flexible, imaginative and high language skills (Backer, 2001, p.148).
In Kovács and Mehler's (2009) study of bilingual babies, bilinguals were found to be easier to adapt to changes than monolinguals. In addition, it was found that bilingual babies have more vocabulary in both languages compared to their monolingual peers (Crivello, Kuzyk, Rodrigues, Friend, Zesiger, Poulin-Dubois, 2016). According to Poulin-Dubois (2016), as children age and their vocabulary grow, the switching from one to the other language accelerates and these switching become more frequent. For this reason, bilingual children exhibit a more flexible posture in solving complicated problems and are more selective and focused on problem-solving skills (Desjardins, 2016).

## THE ADVANTAGES AND DISADVANTAGES OF BILINGUALISM

There are still some false misconceptions about children who learn two languages. Cognitive flexibility develops better in bilinguals, for example, in contrast to the idea that two languages mix people's minds. The bilinguals can see events from two or more perspectives and understand better how other people think (Hakuta, 1986). Moreover, bilinguals have better auditory language skills, such as being able to distinguish the sounds of a language, and are more sensitive than monolinguals. In addition, they matures earlier than monolinguals in terms of language abstraction, such as talking and thinking about
language, (Albert and Obler, 1978, Cummins, 1994).

Cummins argues that the higher linguistic awareness of bilinguals is due to the fact that since bilinguals acquire two languages and two cultures rather than monolinguals, they have a much broader and diverse experiences, and take places with cognitive advantages such as more flexible structuring of thoughts as they have switching (Cummins, 1976, 2001c). According to Reynolds (1991), bilinguals are more capable of adapting to the changing environment due to their separate language environments and their experience of the social and cultural environments of these languages. The fact that bilinguals have two or more words for a single object or concept allows them to look at events from a different perspective, that is, bilingual children are more successful in cognitive control of linguistic processes than monolingual children. Bialystok (2017) says, bilingualism can shape brain structure and cognitive ability. Likewise Al-Amri (2013) also talked about the positive effects of bilingualism.
The benefits of bilingualism affect not only professional life but also social life. The brains of bilingual individuals have two active language systems, regardless of what the preferred language is. So the cognitive muscles of the brain always work. While other people need extra effort and a sharp mind to solve difficult and complex problems, this is simpler for bilinguals. Bilinguals can think of each object or thought with two or more words and phrases, and these talents reinforce their creativity (Doron, 2014). A number of studies have shown that early childhood language acquisition supports children positively in terms of cognitive, social and linguistic thinking skills.

According to Doron (2014), the benefits of bilingualism for children are explained as follows:

- Children acquire skills in new vocabulary and voices as they are exposed to extensive language input.
- They easily separate words in unified voices.
- Categorizing the words comes natural to them.
- The answers are at equal speed in both languages.
- Rhymed words are easier to perceive.
- Bilingual children better understand patterns and patterns even at early ages.

Contrary to all these benefits, there are also studies that think bilingualism has negative effects. For example many studies have emerged to support the claims that bilingualism had negative effects on intelligence and cognitive ability. The results of such studies led the researchers to claim that bilingualism is a mental burden for bilingual children causing them uncertain and confused (McLaughlin, 1978; Saunders, 1988). Carroll (1968) reported in his study that bilingualism encourages facile and superficial mental attitudes. In addition, Carrow (1957) in Appel \& Muysken (2005) found that monolingual children in silent reading, oral reading accuracy and comprehension, spelling, hearing, articulatory skills, vocabulary, and arithmetic reasoning better than bilinguals. A few researchers also believed that bilingualism could impair the intelligence of a whole ethnic group and can be seen as something unnatural (Weisgerber, 1933; Saunders, 1988).

## BRAIN IN BILINGUALISM

Another area of bilingualism and brain research is how bilingual individuals' languages are
represented in their minds. At this point, the question "Are these representations are independent of each other or are there dependencies between them have gained importance (Baker, 2001c: 143). Researchers such as Fabbro (2002) used techniques such as PET and FMRI to investigate the language arrangement in the brains of bilinguals; they have examined linguistic stimuli such as word processing, sentence processing and short story processing, and attempted to reveal linguistic processing in bilingual individuals. Accordingly, the word information of D1 and D2 is represented in the same brain areas regardless of the acquisition age of the person. However, the words of D1 and D2 acquired after the critical age are stored in the notification memory systems in the left cerebral associative memory areas serving language functions. When examining the cerebral areas activated by bilinguals in early ages and older ages with two languages during sentence processing tasks in D1 and D2, it has been observed that in both languages, the bilinguals display the same activation in Wernicke and Broca areas at early ages; there are important differences between D1 and D2 in bilinguals in late ages when activating in Broca's field. Also, in late years, bilinguals have been identified to have two distinct, but contiguous, centers in the left Broca areas

Figure 1. In these figures D1 is 'yellow-red', D2 is 'blue' D3 is 'green'


As seen in Figure 1, if the second language is acquired at an early age, the density increases in the same place (especially in Broca's area).

However, if it is acquired later (Figure 2), it is seen that new network structures are formed and language acquisition is divided and different sections in the head assume this function.

Figure 2. There are three different notations as indicated above (1), (2), (3)


The first of these representations are between the ages of 0-2, the second between the 2 -adolescence period, and the third the adult formations. As can be seen, brain cells are less connected to each other in language learning as the individual's age progresses (Url 2).

## BERNSTEIN'S CODE THEORY

Sociolinguists examine the way bilinguals switch from one language to another and their behaviors in the social context. In all societies there is a large verbal repertoire with different languages, different dialects and different styles (more or less formal). According to Bernstein's code theory, students develop values within the culture of the school through contradictory and paradoxical practices - external global market forces and pedagogies are becoming more market-oriented, yet traditional social hierarchies, social values and traditional rituals and practices are being retained, creating oppositional discourses within the school culture (Bernstein, 2000). The varieties of languages are chosen from this repertoire based on the characteristics of the social context according to the nature of the talk and the formality of the situation. The style change exists in all Englishspeaking societies. For example; someone can speak stupid or more ridiculous or less ridiculous depending on the spoken person, the spoken
subject, the situation and the situation desired to be created. Some English-speaking societies have two dialects with different styles as well as multiple dialects (Mcarthur, 1998).
When the children in the two language acquisition process start talking, they usually use the items belonging to two languages in the same word or conversation flow. This behavior has been termed by many researchers as mechanism mixing or assembly shifting (Ekmekci, 1993). The items of the two languages used in the conversation can belong to the sound, word, or linguistic construct. The most frequently encountered mixing mechanism in children is the use of some words in the other language while using a language. The fact that children's mixing two languages with each other has been interpreted as that the presentations of the two languages are not separated neuro-cognitively (Geneese, 2002, Akt. Bakırlı, 2008).

Code switching is defined as the combination of two languages in a single discourse, and using them alternatively in a sequence (Bhatt, 1997; Brice \& Anderson, 1999). Code switching is made within sentence boundaries and different languages are used in the sentence. Words and phrases from two languages are contained in a single sentence (Brice \& Anderson, 1999). Code switching involves the use of two or more
languages at any level (Myers-Scotton, 2009). Code switching is a linguistic behavior involving both the perceiving of the language (understanding) and the production of language. Issues of interest include brain and speech difficulty as well as mental dictionary (Wang \& Liu, 2013). Crivello (2016) says that language switching provides an advantage for bilinguals in conflicts. In conflict situations, the child ignores certain information. This shows the experience of switching between languages, for example to use the second word even if it is easier to reach the first word.

Interest in code switching studies began with Epinosa's (1917) writing on "speech mix" in the discourses of new Mexicans in the 21st century (Huerta-Macias, 1983). Code switching has been something that has been happening in America's classrooms over the last 20 years. Hammink (2000) defines code switching as; Language poverty, low prestige, biased use and inadequacy in both languages. On the contrary, Pollard (2002) supported the use of code switching in bilingual classrooms as a strategy that made communication more effective. Code switching is one of the most used communication methods among foreign language learners (Burenhult, 1999). These children do not denote code switching negatively, but instead view it as a means to transmit information more effectively.

Code switching not only serves to improve communication in the learning-teaching process, but also helps bilinguals to maintain and develop their languages. This code switching is used to "identify, to emphasize, to elaborate the receiver, in short, to effective communication" (Macias, 1983). For the speakaer, using code switching in the language he feels more comfortable can alleviate language insecurity (Burenhult, 1999).

Code switching is the term at least two languages combined in different forms are spoken at different levels. For example, as in the bilinguals of Malaysia and English. This morning I hantar my baby tu dekat babysitter tu lah (hantar took, tu dekat to the, lah a particle marking solidarity A code can be a language or a language style or variety (Mcarthur, 1998 b).

There are 4 major types of switching:

- Tag-switching: Certain expressions in a language is put another saying into another language. For example, as in Punjabi and English bilingualism. For example, as in Punjabi and English bilingualism $\quad \rightarrow$ It's a nice day, hana? (hai nā isn't it).
- Intra-sentential switching: Switching within the bounds of a sentence or clause (Mcarthur, 1998 b). In the same sentence, it comes from the single root. The switching happens in the same component as in the case of si-ko sure, na-suspect, and zi-ta-open (Scotton, 1995). For example, Yoruba (the language spoken in western Africa) and the English bilingualism $\rightarrow$ Won o arrest a single person (won o they did not).
- Inter-sentential switching: The switching of languages is within the bounds of a sentence or clause that is in a language or other languages (Mcarthur, 1998 b). It includes swtiching from one language to the other (Scotton, 1995). For example, Spanish and English bilinguals say $\rightarrow$ Sometimes I'll start a sentence in English y termino en español (and finish it in Spanish).
- Intra-word switching: This switching occurs in a word boundary. For example, as in "shoppã" (English shop with the Panjabi plural ending), or kuenjoy (English enjoy with the Swahili prefix ku , meaning 'to') (McArthur, 1998 b).


## METHOD

## RESEARCH DESIGN

In this study, a case study as one of the qualitative research methods was used. Case study is a method in which one or more events, the environment, the program, the social group, or other interrelated systems are examined in depth (Büyüköztürk et al, 2016). This method is preferred in order to examine how the code switching process mentioned in Bernstein's theory is performed in bilingual children, to identify the
details of the event, and to see if the use of code switching is effective. For this purpose, bilingual children were observed and the code switching were examined according to the theory explained in the literature and the observations obtained were noted.

## DATA COLLECTION TOOLS

As data collection tools, unstructured participant observation, unstructured interview forms were used. Limited focus was done during observation. Limited focus is the observation of only one element or feature (Büyüköztürk et al, 2016). Accordingly, how the bilingual children tried to be reached in the research use their mother tongues and the other languages (whether or not they use code switching) have been carefully examined.
The communication of students with their peers and their teachers has been examined through notes. These observations included the student's expressions, body language, and physical environment. In addition, interviews with teachers about the students' relationships with their peers, the situation within the classroom and the situation within the family constitute the data of the research. In the first instance, the researcher's presence in the class was a curiosity among some students, but the researcher was a regular part of the class in the next period. The researcher took part in the classroom as a participant observer. She recorded all processes in the classroom on the observation form.

## PARTICIPANTS

Participants were selected from different schools. The first participant mother was American, Turkish father; a 5 -year-old girl and a second participant mother Portuguese, Turkish father; A 7 year old male student. Male student has been exposed to 3 languages since his young age: Portuguese, English and Turkish, while female student has been exposed to 2 languages, English and Turkish. Participants were selected after the schools with bilingual students in Gaziantep were identified and the necessary information was obtained from the teachers and administrators about their situation. Participants have mothers of different cultures. The social circles of the families
are largely similar and they are bilingual. Therefore, these children were selected for research.
The first participant has the possibility to use both languages in the classroom. He has been living in Turkey for two years. His peers in the class speak English and Turkish at almost the same level. The second participant has been living in Turkey for 3 years. The peers in her class do not have a conversational level of English knowledge and there is no classroom environment that allows the participant to use English. The first participant is coded with E and the second participant is coded with I.

## DATA COLLECTION PROCESS

The data collection process started after the purpose of the research was determined and schools with appropriate students were identified. After schools and students were identified, information was gathered about the students through interviews with teachers first. Participants were observed at different times, the first participant for 30 minutes and the second participant for 80 minutes. The first participants' observations were limited to 30 minutes because it was not allowed more. This is a limitation for the research. Participants and researchers interacted with each other in order to obtain the necessary data during the observations.

## DATA ANALYSIS

The analysis of the data was subject to qualitative method. Observations were used to identify code switching cases within the class. These cases were then analyzed according to their degree of being able to express their communication and information about the subject.

## ETHICAL CONCERNS

At the beginning of the research, the teachers of the student to be observed were interviewed and information about the research was given. A confidentiality agreement was prepared by the investigator. This contract mentions the content of the research and is signed by the parties,
committed to compliance with ethical rules and not to have special sharings about children.

## VALIDITY AND RELIABILITY

A note was kept during the observation to ensure the validity and reliability of the study. The researcher interpreted the data he obtained, consistently with each other and with similar studies in the literature. The data obtained in the study were shared with the participants' teachers. The data collected in the research were also shared, discussed and exchanged ideas with the relevant experts. In addition to these With the aim of ensuring consistency, and verifiability, precautions such as expert opinion and detailed description were taken.

## FINDINGS

In this section, the findings of two case studies is presented. Each case sample is discussed under its own title and the proposals for the relevant research is made under the same heading.

## CASE/ PARTICIPANT (1):

The data for this case was obtained from a class including international students in a private kindergarten. While some of the children have Turkish parents, most of them have parents of different nationalities. There are two teachers in the classroom. One of the teachers is foreign (does not speak Turkish) and the other is Turkish but speaks English mostly in the classroom.

A total of 7 students were observed in this class. Children were coded as M, O, K, U, L, E and C. M is 3 years with American mother and Turkish father; O is a 3.5 years old with Italian mother and British father; K is 5 years old with Turkish parents; U is 3 years old with Turkish parents; L is 4 years old with Russian mother and Turkish father; E is 5 years old with American mother and Turkish father; C is 5 years old with Turkish parents.

During observation, a child (E) was focused on. Cases will be given from E and L students by the researchers. The analysis and interpretation of the data was mostly based on the data from the student E's speech. The reason for choosing this student is
that he is much more active and open to communication than other children.

Researcher: How old are you?
Student E : I don't know. But for my birthday, i have birthday benim doğum günüm çok yaklaştı.
E: has used code switching in this dialogue. The code switching that E makes is an example of the inter-sentential switching technique mentioned in the literature. He starts with English answer to English question, then continues in Turkish by switching among sentences.

Ongoing dialogues have developed in the following way:
$\underline{L}$ : (shows her dress) bak!
Researcher: Ne kadar güzel elbisen var !
E: Benim de öyle elbisem var. Ama benimki böyle purple. Üstünde de böyle çiçekler var, değil mi Lo? Ama L'inkisi de böyle.
In this dialogue E is involved in the conversation of her friend L and the researcher, and makes a code switching. Although the phrases in her conversation are in English and she says the color of the dress in English

Turkish teacher: L'nin annesi Rus babası Türk.
E: Öğretmenim benim babam Türk mü?
Turkish teacher: Evet senin baban da Türk.
E: (turning back to researcher) benim de babam Türk.

Researcher: Peki annen?
E: Annem Amerikalı.
In this dialogue E speaks completely in Turkish. Then he turns to M who is attracted him and speaks English and asks what is in his hand:

E: is yours?
Goes on after turning to the researcher:
E: Sometimes M cry because ikra always hurt her.
E: continues to talk about M .
E: Always she put dress. She cut all the time morning and she very dress dress dress no panth.
Researcher: Do you also have many dresses?
E: Yes.

In this dialogue, E speaks completely in English. E continues his speech by showing his friend and says:
E: no deyince ne diyor biliyor musun?
Researcher: Ne diyor?
E: Gülüyor.
E: M.
Researcher: Do you know how old is she?
E: (showing 'two' with his fingers)" this"
Researcher: Oh really! She is just two years old.

## E: Yes.

Researcher: All right. What are you doing now?
Elif: It's toy. İt's toy bilgisayar. (bilgisayarın tuşunda bulunan kediyi göstererek) look, cat.
In this dialogue, E continues to answer the English question in English while speaking in Turkish. In the last expression, he used Turkish word by making code switching in the English sentence.

## CONCLUSION FOR CASE 1

In this case, it was seen that occasional code switching occurs within the sentences used by the observed student. It was seen that code switching is done by switching from English sentence to Turkish, using Turkish word in English sentence and English words in Turkish sentences. This case is an example of how code switching is used effectively.
In this case, the student can communicate with peers and teachers in both languages and can easily express what he thinks about the subject. Having teachers and peers who understand the languages the students used and the classroom environment allowing code switching use enable the student to communicate effectively and the student does not be encounter with the language barrier. As a result, it can be said that there occurred an effective learning environment and the social (communication) skills of bilingual students who can use code switching can be supported positively.

## CASE/PARTICIPANT (2):

In this case, the data was collected from the kindergarten in the Private College. Teachers and peers in the class are Turkish and give education in Turkish. English is only taught as a branch course. The dialogues and interviews of the researcher with the student " i " who is 7 years old with Portuguese mother and Turkish father are presented as examples. The student has been observed at different times in 4 different courses and activities and except for the course. Since the student's communication during the course was found to be inadequate, unstructured interviews with the student were conducted. The student refused to answer in the beginning. The researcher spoke English in order to relax the student in his speech and said "You can speak English i. I understand you when you speak English."
The dialogues between the teacher and the student in the lesson and the researcher and the student outside the class are as follows: The Turkish language efficiency and examples dialogues between the researcher and the student outside the class will be given and interpreted.

The teacher reads a story about the forest and asks the children questions about the story:

Ö: ihsan sen hiç ağaç diktin mi?
İ: um.. diktim.
Ö: nereye diktin?
İ: ummmm.... Ağaç kesenlerde umm.. tehlikeli değilmiş.
Ö: hiç piknik yaptınız mı? Pikniğe gittiniz mi?
İ: ben gittim.
Ö: ormanda mı yoksa bahçede mi?
İ: bahçede
Ö: beren neye üzüldü ?
İ: umm çünkü ağaçtaki umm çünkü evdeki gitmiş uyudularmış yatakta... umm..
As seen in the dialogue, when student is asked about a specific topic in Turkish, the student is having difficulty in answering and making meaningless sentences. In doing so, he did not use a foreign word or an English word in any expression, even if he made some long sentences.

This situation has made it more difficult to communicate because it communicates with a language he is not good at.
Ö: what do you see in the picture?
İ: tree.
Ö: what color is it?
İ: green.
Ö: and what else can you see?
İ: hause
Ö: is your house like this?
İ: No.
Ö. What is she doing?
$\dot{I}$. She is computing.
In this dialogue that takes place in the English course, the student gives only one word answers in English to English questions. However, it has been observed that he can speak English partly smoothly and fluently. In these expressions, although there is no code switching or language mixing, he has provided much simpler answers far below his ability.

The dialogue with the researcher is given in the following example:
A: Have you any brother i.?
İ: No. Benim erkek kardeşim p. ve k.
A: Who are they?
İ: Umm...
A: they are your brothers?
İ: Um.. benim abim Ali. Benim N. ablam... umm..
A: You can speak english İhsan. I understand you when you speak English.
İ: Do you like pancakes?
A: Yes.
İ: I like pancakes too.
A: İts delicious, ja?
İ: Ja
$\dot{\mathrm{I}}$ : at deniz we are swimming. Do you like swimming?

A: Yes, i like swimming. I am swimmer.

I: I like too, at the Gaziantep 1 can swim.
A: Which style can you swim?
İ: Babayla... With dady obidik obidik.
A: Your style obidik?
İ: (laughing) ja. (goes on) I have big truck. My birthday i have basketball, lego, big truck very big truck. They are singing me "happy birthday ihsan". and tomorrow 8 May anneler günü kutlu olsun

A: tomorrow or yesterday?
İ: happy mothers day.
A: What did you do for your momy?
İ: i give a chocolate.
A: Did you a buy gift for momy?
İ: Yes flowers..
A: How old are you?
İ: İ am 7.
A: You are a big boy. Have you any small child, baby at home?
İ: No, we don't have baby.
A: Is there someone else at home?
İ: lale, leyla, Nancy, momy and dad, and i, N. abla,
E. abla, babanne, all the aile.

İ. Restoranda yemek yedik, fotoğraf çektik, aile olduk.

A: ne zaman gittiniz restoranda, dün mü?
İ: Hayır 24 nisan da restoranda gittik.
In the dialogue above, as the student continues to speak, he has begun to make more comfortable sentences and expresses his ideas clearly. He even led the conversation and made the transition to different subjects. From time to time he made code switching and when he realized that he did not suffer from language barrier, he was able to speak fluently in Turkish and in English.
CONCLUSION FOR CASE 2

One of the examples shows the positive effect of the use of code switching and the other shows the negative effect.

In this example, participant 2 could not communicate with code switching due to language barrier and classroom environment. His language has been interrupted because the student is trying to express his / her thoughts about the topic or to talk to the target while communicating. The students were influenced because of the lack of sharing information about the subject and the lack of communication with his Turkish speaking peers and Turkish speaking teacher. As a result, the student was not able to express his / her thoughts about the subject. Failure to understand and accept the code switching and the mother tongue (by peers and teachers) has led to failure in communication of the student.

One of the cases showed positive use of code switching, and the other side showed negative. The effective/positive (case 1) aspect is the result of having appropriate conversational environment which allows the use of code switching. In this example, the student can communicate with both their peers and their teachers in both languages and they can express what they think about the subject.
These effective and ineffective examples are the guides showing if the use of code switching in the process of language acquisition is harmful or useful.

On the other hand, in the negative case (case 2), the use of code switching was the result of the interruptions while expressing his ideas about the topic or communicating in the target language (not being able to share information or the lack of communication with Turkish speaking peers and teacher) because of language barrier and classroom-school environment. Not being understood or acknowledged of code switching and mother tongue by peers and teachers caused failure in students' communication.

As in the dialogue below,
Ö: ağacın kökünün bize ne faydası vardı? (What kind of benefit does the root of the tree have for us?)
İ: umm faydası.... ( umm.. its benefit..)
Ö: Ağacın kökleri ne yapıyordu? Neyi tutuyordu?
İ: umm...şu bir ağaç ormanda toprağındaki ....

Code switching is usually conducted between the Turkish and English languages during the game or classroom communication to communicate with peers and teachers in the environments where bilinguals are located. When the child talks, he can use code switching, even if he knows the meaning of the word in both languages. This makes him communicate more fluently and enrich his conversation even more.

## DISCUSSION AND SUGGESTIONS

The results of this study were similar to those of Pollard (2002). Pollard (2002) studied with Hispanic children in two different classrooms. One class is a class that offers bilingual education and the other class is only immersion. At the end of the observations of the two classes, the immersion classes have resulted in more bilingual learners experiencing more communication difficulties and more vocabulary deficits than the classrooms allowing to use both languages.
Guo and Mackenzie (2015) have investigated codes and signs in early childhood. They investigated two children, Luke and Jim, just started to learn English. As a result of the research, it was seen that they could communicate using code switching without knowing the language. The term code-switching refers to the alternation of languages by multilinguals (Albarillo, 2018). This concept becomes important, especially in countries where more than one language is spoken. For this reason, it is seen that theories that will facilitate these processes are included in education programs and applications. Being bilingual in countries such as Turkey where the dominant mother tongue is a situation encountered less. For this reason, processes that support bilingual development are less involved in the education system. As seen in Participant 2; it is observed that children who are not supported to the code switching under the right conditions suffer from this situation and cannot acquire a language completely. The vocabulary (fewness) and the fluency in speech that the learner prevails in Turkish should not give the listeners what he knows about the subject. In many cases, it appears that students have achieved the competency in this language later (Pollard, 2002).

Lin (2008) emphasizes that code switching implementations are important if there is more than one bilingual child in the classroom. Her research is showed that the difficulties and problems faced by this field of studies on how this field might move forward in the future are discussed. The basic research question Albarillo, (2018) investigates is whether there are types of information activities and places where multilingual students code-switch. Another important finding by Poplack (2000) is the positive attitude of the speakers who code-switched more toward their language. The language environment of bilingual children is complex and fluid. Does it suggest that people who speak and read a language are more engaged in that language? It's difficult to tell and is further complicated for multilingual people who speak different languages.

Research has shown that the use of code switching, that is, allowing language switching, has a supporting role in children's acquisition of a new language. This research is especially important to show teachers the way they should follow in bilingual classrooms.
Under the light of the data obtained from the study, bilingualism should be supported starting from early ages. The activities related to this should be included in the communication skills of the students with the programs and activities organized by the related departments. Priority language preferences should be offered to foreignborn children.

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