A Needs Analysis Study on Interdisciplinary Gender Equality Education: Turkish Context[1]

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Abstract
The purpose of this research was to identify the need for gender equality education. For this purpose, the views of mathematics, science, and information technology teachers on the current situation of gender equality in schools were determined. In addition, the awareness of sixth, seventh and eighth grade middle school students on gender equality was examined. This study was a descriptive research conducted in a qualitative context. In data collection, an interview form on teachers' views and a written view form on students' awareness about gender equality were used. Research data were collected in the spring semester of the 2017–2018 academic year. As a result of the research, it is thought that an interdisciplinary gender equality education will be beneficial to improve students' awareness.

Keywords: Gender equality education, Mathematics teachers, Science teachers, İnformation technologies teachers, Middle school students, Needs analysis

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Introduction

In the world we live in, differences between people such as race, class, gender, and age can lead to various problems regarding equality and social justice in the social area. It is stated that people with individual diversities are exposed to various inequalities in accessing resources and opportunities due to their physical, mental, gender, ethnicity, belief, and cultural differences (Uzunaslan & Tek, 2019). Within these differences, one of the most influential in a social context is gender inequality. "Gender inequality," as the matter through which equality is most emphasized and discrimination takes place the most, results from society's perception of women and men (Özkan, 2020). When research and statistical data concerning this subject are analyzed, it could be asserted that there are various problems regarding gender inequality within the Turkish context. Türkiye ranks 129th among 146 countries in terms of gender gap index, according to the Global Gender Gap Report 2023 ranking (World Economic Forum [WEF], 2023). Türkiye is behind European Union countries regarding the gross enrollment rates of girls at all levels of education, the gender equality index, and the expected years of education of girls from primary to tertiary education (Maya, 2013). When the net enrollment rate in tertiary education is analyzed, this rate is 40.6% for men and 46.3% for women (Turkish Statistical Institute [TURKSTAT], 2021a). According to this data, the enrollment rate of women in tertiary education is higher than men's. However, analyzing the employment rates, the employment rate of women is seen to be lower than half of men's: According to the Household Labour Force Survey, the employment rate was 28.7% for women and 63.1% for men in Türkiye in 2019 (TURKSTAT, 2021c). When the data on R&D employment is examined, 68.1% of the sectoral distribution by gender is men and 31.9% is women (TURKSTAT, 2021b). Although women have shown presence in the fields of science, technology, engineering, and mathematics since the establishment of universities in Türkiye, they face invisibility in job markets and occupational areas due to their traditional gender roles (Öztan & Doğan, 2017). Based on this, it can be said that there are inequalities in different fields regarding gender.

Gender inequality can be experienced not only among adults but also among children and young people. Students come to school with their beliefs concerning their age, ethnicity, physical features, sex, neighborhood, and other variables, and these beliefs are composed of knowledge of a certain network they are part of and their past experiences (Beane, 1990). Lack of knowledge about diversity can make students vulnerable to conforming to social actions that promote discrimination and prejudice (Tolentino, 2009). For instance, it is stated that gender-based occupational stereotypes started to form in primary school years; that creates a basis for gender inequality in society and the business world, and therefore, it is significant that these gender-based occupational stereotypes are addressed from the early stages of life (Çimşir & Akdoğan, 2020). Problems such as sexism, old age, and socio-economic class should be dealt with, and we should hear the voices of silenced people or those whose voices we do not hear, such as women, the poor, and disabled people (Miner, 1995). Besides, schools should adapt to the problems that may arise from the gradual increase of diversity within societies in terms of language, religion, and culture, and arrangements should be made in this regard (Ragnarsdóttir & Blöndal, 2014). It is stated that in many countries, as in Türkiye, one of the venues for reactions to gender equality is schools, and anti-gender movements continue in Latin America, Europe, and Türkiye (Şahin, 2020). Also, in various studies in this regard, it is indicated that students have deficiencies regarding equality value (Acar Erdol & Gözütok, 2017; Bağçeli Kahraman & Başal, 2011; Kalaycı & Hayırsever, 2014; Kılıç, Beyazova, Akbaş, Zara & Serhatlı, 2014; Yeşil & Balcı Karaboğa, 2021; Yolcu, 2021; Yolcu & Sarı, 2018); gender inequality takes place at the top ranks through social problems in schools (Turhan Türkkan, Yolcu & Karataş, 2017). There are many studies concerning this topic conducted in Türkiye and these are summarized below.

Various studies have been carried out in Türkiye to determine the current situation regarding gender equality and the need for gender equality education. In a study conducted on seven- to eight-year-old students, it was determined that students had stereotypes about gender when choosing toys (Bağçeli Kahraman & Başal, 2011). In another study on gender equality sensitivity, it was determined that primary school fourth grade students lean toward equality, but they had traditional stereotypes and views on women being weaker and powerless, and in line with this result, it was seen that students' sensitivity towards gender equality needed to be developed (Yolcu, 2021). In a similar study with primary school fourth graders, it was found out that students have gender stereotypes regarding occupations and households (Yolcu & Sarı, 2018). In the study conducted on the gender perceptions of primary school students between the ages of seven and fifteen, it was determined that children's perception of gender changes according to their age period; however, being a man is considered more valuable in every period. In the study, it was also stated that despite all the expressed difficulties of women's roles, the fact that both gender groups expressed that it is more difficult to be a man in terms of the importance of the responsibilities taken in adulthood shows the effectiveness of gender perception (Kılıç, Beyazova, Akbaş, Zara & Serhatlı, 2014). Through research examining the current situation of middle school students regarding gender equality, it was put forward that middle school students did not know the concept of gender and adopted traditional gender roles (Yeşil & Balcı Karaboğa, 2021). In addition, it has been determined that eighth grade students have views on gender inequality and sexist

approaches are higher, especially at the lower socio-economic level (Kalaycı & Hayırsever, 2014). In a study conducted for high school students, it was found out that students had educational needs on the concept of gender, gender roles and stereotypes, women's participation in decision-making mechanisms, violence against women, and women's participation in business life and income (Acar Erdol & Gözütok, 2017). These mentioned studies are aimed at primary, middle, and high school levels and are few in number. Based on the results of these studies, it is thought that students' awareness of gender equality in formal education should be improved.

It could be said that most of the studies concerning gender equality in education were conducted with pre-service teachers. In one study with pre-service teachers, it was put forward that they need an education for gender equality (Acar Erdol, 2019). In another study in this context, it was found that most pre-service teachers have traditional gender perceptions (Aydemir, 2019). In the results of a different study on this topic, it was determined that the metaphors pre-service teachers brought about related to their gender perceptions included gender inequality, and it was identified that individuals lack fundamental knowledge regarding gender in terms of education (Aslan, 2015). Through a similar study, the views of education faculty students in Türkiye on gender equality were examined, and as a result of the research, it was determined that the perceptions of pre-service teachers that make women dependent on men and consider men superior are at a moderate level, and their views tend to be negative as the grade level increases; gender-related views are affected by variables such as the department they study, the region they live in, and the education level of their parents (Acar Erdol, Özen & Toraman, 2019). In a different study examining pre-service teachers' views on gender equality, it was found out that early childhood pre-service teachers have stereotypes about gender roles (Koyuncu Şahin, Esen Çoban & Korkmaz, 2018). From this point of view, it can be said that pre-service teachers, who are the teachers of the future, have deficiencies in terms of gender equality.

In addition to their responsibilities towards students and parents, schools also have responsibilities towards society (Au, Bigelow, & Karp, 2007). Schools and teachers are agents of socialization (Tolentino, 2009). Personal and social values of individuals are affected by practices in school (Beane, 1990). Schools could become tools for reproducing the discrimination in society (Karp, 2007). Starting from these explanations, it is seen as necessary to take action in order to abolish the problems regarding inequality in social contexts and schools. Besides, the fact that pre-service teachers have stereotypes in this matter leads to the thought of teachers' also having stereotypes and preconceptions related to gender inequality. On the other hand, this situation brings about the possibility that gender equality could continue in schools and could be conveyed to the students via teachers as well. In this respect, the significance of determining the current situation of students regarding gender equality and whether they need gender equality education is increasing.

Along with the current situation analysis and needs analysis studies, there are various studies concerning the examination of curricula and text books in Türkiye regarding gender equality as well. In a study regarding text books, it was detected that the activity in the text book within the Citizenship and Democracy Education course related to the "Towards Equality" subject of the "Democracy Culture" theme was not appropriate for developing awareness in students for gender equality and strengthening it (Kalaycı & Hayırsever, 2014). In addition, it has been determined that women and men in middle school mathematics textbooks in Türkiye are presented with stereotypical descriptions, and the labor force participation rate of women in the texts in these books is lower than that of men (Çelik, Aydoğan Yenmez, & Gökçe, 2019). In another study conducted on textbooks, it was revealed that there are deficiencies in gender equality in sixth grade Turkish textbooks within the sample. It has been observed that there are situations such as gender frequencies, number of occupations, attitudes and behaviors of genders, and male characters having more options than female characters in domestic and out-of-family actions (Güney, 2016). In a similar study, the opposite elements of gender equality and sexist stereotypes in Turkish textbooks for middle school were detected (Kükrer & Kıbrıs, 2017). Besides this, in another study, it was pointed out that there is an emphasis on gender equality in the texts in the primary school fourth grade human rights, citizenship, and democracy textbook; however, in the visuals of the book, there is gender inequality and stereotypes while occupations are being represented (Işık Demirhan, 2021). Through a study concerning curricula in middle school, it was seen that statements on gender in curricula updated in 2017 outnumbered the statements in reorganized curricula in 2018. Additionally, it was found out that even if an important step was taken in cleaning the middle school curricula from the concepts emphasizing gender inequality with the updates in 2018, the studies were found to be insufficient in terms of presenting examples of gender equality (Karakuş, Mutlu, & Diker Coşkun, 2018). In line with these document analyses at issue, it can be said that there are also deficiencies regarding gender equality in textbooks and curricula. Based on this, it is thought that gender inequality could be continued via textbooks and curricula, and these stereotypes could be transferred to students. In this respect, it is considered important to reveal the current situation regarding gender equality in schools.

It could be considered that problems regarding equality and social justice should be at the university level because of their great and difficult nature; however, it is seen as necessary that the education to be carried out in this context be in the education's formative period of perspective-creating skills, that is, in the primary school years (Wade, 2007). Students at the primary school level can understand some inequalities around the world, and education in this subject could be given during the primary education period (Peterson, 2002). In addition, dealing with social matters at the middle school level seems significant (Schniedewind & Davidson, 2006). In a study carried out in Türkiye, it was determined that men generally experience gender discrimination at the middle school level, while women experience discrimination in high school. The ones displaying sexist behaviors in the educational process are mostly teachers, and men are exposed to physical punishment while women face gender discrimination through their educational process (Esen, 2013a). Based on these explanations, it is thought that it would be beneficial to start at the middle school level to determine the current situation regarding gender equality.

Gender equality is recommended to be promoted using a horizontal approach that encompasses all learning activities that allow women and men to develop their talents and be fully represented in society (Örs & Kaya, 2021). STEM (Science-Technology-Engineering-Mathematics) fields are seen as the areas where gender inequality is seen seriously, and inequalities in education and employment in one of these areas could strengthen the inequalities in other fields as well (Beşpınar & Pehlivanlı Kadayıfçı, 2021). The underrepresentation of women in STEM fields is a concern for social scientists and policymakers (Stoet & Geary, 2018). The rate of women in science-based employment is low (Blackwell & Glover, 2007). Hence, addressing the gender equality topic in an interdisciplinary context with mathematics, science, information technologies, and software courses in a gender equality curriculum could contribute to raising awareness in this field.

It is suggested that the values of justice, friendship, honesty, self-control, patience, respect, love, responsibility, patriotism, and benevolence be considered both on their own and with other values they are associated with in the learning and teaching process, as well as in the curricula for mathematics, science, information technologies, and software courses applied at the middle school level in Türkiye (Ministry of National Education [MoNE], 2018a; MoNE, 2018b; MoNE, 2018c). In addition, it is recommended to associate values such as flexibility, aesthetics, equality, justice, and sharing with the appropriate attainments, along with the eight key competencies determined in the Turkish Qualifications Framework in the mathematics curriculum (MoNE, 2018c). Gaining the values of equality and justice also takes place as a goal in the curricula for these three courses implemented in Türkiye, and establishing interdisciplinary relations is considered important.

Mathematics education has the potential to develop skills for solving the global challenges that future generations may face (Wright, 2017). It seems necessary for students to learn the relationship between social problems and mathematics in order to realize local, national, and universal inequalities (Spielman, 2008). Besides, it is considered an opportunity to teach subjects such as equality and justice in mathematics courses together with other disciplines (Gutstein et al., 2005). Moreover, mathematics is seen as a significant tool in equality and justice education (Gutstein, 2007). It is stated that people need interdisciplinary knowledge between mathematics and equality in order to realize the relationship of inequalities in their daily lives with mathematics (Tanase & Lucey, 2015). In this sense, a mathematics course could create an important opportunity to gain awareness regarding gender equality.

Examining the literature concerning science education, it is seen that female and male students have reached the conclusion that science is a study subject and career path suitable for only men, as the representation of women is at the minimum level in science teaching curricula and materials (Sanders, 1997; Hammrich, 1997; American Association of University Women, 1998; Halpern et al., 2007; Hill et al., 2010). Social justice education is not theorized enough in science education (Dimick, 2012). Even if science television, science clubs, and maker fields are important places for some young people and adults to enjoy and engage in science, the matter of normative social structures over who could do science still remains and restricts powerful social justice and inclusive practices (Dawson, 2017). According to İdin and Aydoğdu (2017), having a good science education in middle school also means having a good high school education at the same time. They think students are not equal in terms of social justice and equal opportunity, and that the opportunities students cannot have are the reasons for dropouts. Educators, who draw attention to how traditional education hinders the education of women in the field of science, indicate that there is a need to address gender inequalities in science education (Hall, 2011). At this point, it is considered that gaining awareness of gender equality has a significant role in closing the mentioned gap in science education.

Conscious and adequate use of current technologies is of great importance in terms of information technologies and software courses in order for the teaching environments to be effective and beneficial. When looked at in the literature, gender inequalities in computer access and usage in school and at home are defined in many studies

(Clegg & Trayhurn, 2000; Durndell, Glissov, & Siann, 1995). In addition, the differences in attitudes and preferences concerning computer applications (Beynon & Mackay, 1993; Colley & Comber, 2003; McKinnon & Nolan, 1990; Mitra, LaFrance, & McCullough, 2001) and gender-based practice and culture areas (Culley, 1993; Ryba & Selby, 1995) were also put forward in a lot of studies. While there are also studies showing that women are disadvantaged both in information technologies education and the workforce (Good, Rattan, & Dweck, 2012), if men continue to be the inventors of what they invented and women are the users of it, it becomes an inevitable reality that women will get weaker and disadvantaged in an age where technology advances. Hence, women need to be more included in the information technology field (Margolis, Fisher, & Miller, 1999; Ryba & Selby, 1995). It was observed when the informational technologies and software course curriculum in Türkiye was examined that there was an expression of "scientist (men of science)" (Karakuş, Mutlu, & Diker Coşkun, 2018). This and similar expressions, including gender bias in curriculum, make negative charges against women. The education area can be a force that can help protect gender equality and provide opportunities for the resolution of change and difference. Therefore, it is thought that integrating and arranging the studies aimed at changing the perceptions of gender equality into the information technologies and software course will be an important step for the studies to be done in this field. Indeed, in research on the online social justice education platform, which includes the use of technology for social justice education, it has been concluded that technology can be used to support education and actions for social justice (Mitchell, 2015). Based on this, it is considered that information technologies and software course can be used as a tool in the teaching of social issues such as social justice and equality.

Based on the results of all these studies, it is concluded that there are a limited number of studies examining the current situation of students regarding gender equality in the context of Türkiye, that students' sensitivity towards gender equality should be improved in these studies, and that arrangements for gender equality should be made in terms of textbooks and curricula. It can be said that it is mostly examined in courses in social areas, that this issue is an interdisciplinary problem and that solutions should be addressed with an interdisciplinary approach, and that studies addressing the current situation regarding gender equality at the middle school level are needed. Based on this, it is thought that it would be useful to examine the current situation regarding gender equality at the middle school level and to take into account the courses in the numerical field in this analysis.

It has been planned to design a middle school curriculum to reduce stereotypes and prejudices among students regarding gender equality and to ensure gender equality in social contexts. Before designing this curriculum, it is required to do a needs analysis as a first step in the curriculum development process. It is planned that this curriculum will be designed to be interdisciplinary and integrate mathematics, science, information technologies and software courses with a gender equality topic. In this context, the questions below tried to be answered through this research:
1. How is the awareness status of middle school students about gender equality?
2. What are the views of mathematics, science, and information technology teachers on gender equality education?

Method

This study is a descriptive research conducted in a qualitative context. The participants of the study consisted of 246 middle school students and nine mathematics, science, and information technologies teachers in Türkiye in the spring semester of the 2017-2018 academic year. Of the participant students, 116 are girls and 130 are boys. 91 of the students are studying in the sixth grade, 75 in the seventh grade, and 80 in the eighth grade. The school where the students study is a public school located in a middle-class socioeconomic region in Adana city. In the research, interviews were also conducted with three mathematics, three science, and three information technology teachers working in different middle schools in Adana.

The awareness of students regarding gender equality was determined by the opinion form structured by the researchers. There are five cases concerning occupations, households, sports, promotion in business life, and education. In each case, first of all, their views on the situation were obtained by choosing one of the options "I find it right," "I am undecided," or "I do not find it right." After answering the multiple-choice item, open-ended questions were included to present the reasons and justifications for the views on the situation. The example cases on this form were presented in the findings part in detail. The questions and case studies in this form were also used in a research conducted by the researchers, which was a continuation of this study (Turhan Türkkan, Arslan Namlı, Karaduman & Karakuş, 2024). Within the analysis of the data gathered by this form, techniques such as frequency determination for multiple-choice questions and deductive analysis for open-ended questions were used. For the participant students, code names such as S1, S2, S3, etc. were used.

Semi-structured interviews with teachers were conducted to reveal the current situation of students' awareness of gender equality and their views towards interdisciplinary gender equality education. In order to set teachers' views, an interview form consisting of eight open-ended questions and six open-ended probe questions was developed by the researchers. In the analysis of this data, the deductive analysis technique was used. For participant teachers, related to mathematics teachers M1, M2, M3, for science teachers S1, S2, S2, and for information technologies teachers I1, I2, I3.

For the reliability and validity of the research, the peer examination technique was used. After one researcher conducted the analysis of the data collected from the students, two researchers analyzed one-third of the data. The analyses of these three researchers were compared. As a result of this comparison, a common decision was reached for situations involving differences. In the analysis of the data collected from the teachers, after one researcher conducted the analysis, another researcher examined the codes and themes. As a result of this review, different opinions were discussed, and a common decision was reached. In addition, examples of direct quotes from participant responses and opinions regarding the credibility of the research were included.

Findings

The findings of the study are presented under two headings, namely, findings on students' awareness and findings on teachers' views.

Findings on Students' Awareness

While presenting students' awareness of gender equality, their responses to the case studies were visualized first, and then the reasons for the responses were classified. The answers given by the students to the first case study are presented in Figure 1.
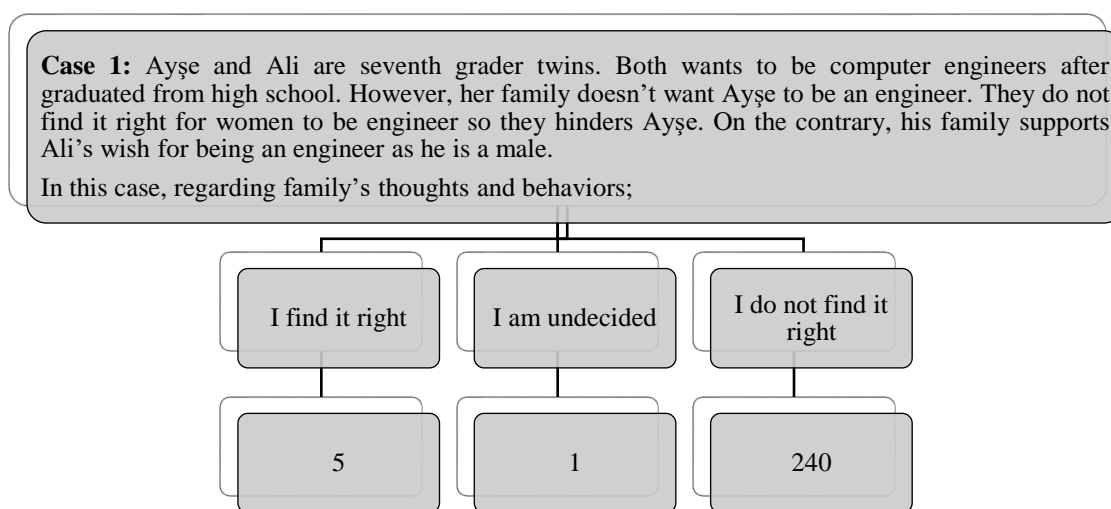

Figure 1. The answers students gave to the first case

As seen in Figure 1, nearly all of the students do not find the situation in this case right. While one student stated that he/she was undecided, five students found the situation right. The reasons given by the students regarding their answers were grouped under two themes: positive reasons and negative reasons. While 205 views were presented regarding gender, 108 views not related to gender were presented in positive aspects. Within the scope of the views on gender, opinions such as disapproving of gender inequality, occupations' having no gender, and the right of women to work were presented. In this line, one student said, *"Because woman and man are equal. It is not right to discriminate about this. Everyone is equal and has equal rights"* (S67, Girl, 6th grade) and indicated that she adopted gender inequality. Regarding non-gender-related views, views such as freedom in choosing the desired occupation, the importance of talent and desire in choosing a profession, and respecting personal choices and decisions. Through the theme of negative aspects, while there were seven views on gender, two views not related to gender were presented. Concerning gender-related views, not finding the right women's work, women's not being successful in engineering, and women's employment in only specific occupations were the views presented. Accordingly, a student said, *"Since I also do not want women to be engineers, who are they to understand computers?"* (S133, Boy, 7th grade), and he put his view on women's not being able to be engineers.

As for the views not related to gender, it is a necessity for parents to choose the profession, not finding it right to choose someone's own profession. The answers given by the students to the second case are presented in Figure 2.

Case 2: Ozan is a 15-year-old boy. Ozan's mother and father are teachers. Ozan's parents are usually very tired when they come home. For this reason, Ozan helps his family in preparing the meal, setting the table and washing the dishes in order to prevent his parents from getting tired more. He helps his family as much as he can in house cleaning on weekends.

In this case, about Ozan's helping his family in households;

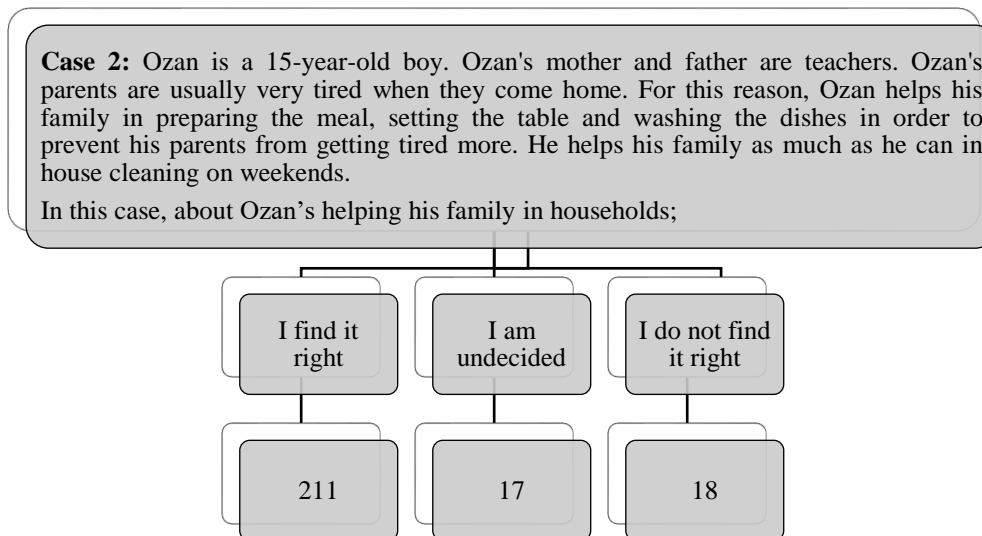| I find it right	I am undecided	I do not find it right
211	17	18

Figure 2. The answers students gave to the second case

As seen in Figure 2, most of the students find the situation in this case right. Whereas 17 students stated that they are undecided, 18 students do not find it right. The reasons students presented for their answers were gathered under two themes: positive and negative aspects. In the positive aspects theme, while 25 views related to gender were put forward, 226 views not related to gender were presented. Through gender-related views, views such as not only women should do the household work but that there is no gender discrimination in helping were presented. For the views not related to gender, sharing households, making the parents happy, and being responsible were indicated. In the theme of negative aspects, six gender-related opinions were presented, while 18 non-gender-related opinions were presented. Concerning gender-related views, households' not being the duty of men and households' being women's duty and serving the father were the opinions stated. Within the views not gender-related, the necessity of caring for homework, not being appropriate for children, and that a housemaid should be hired were indicated.

Case Study 3: Damla is a middle school sixth grade girl who loves football very much. As she likes to play football, she plays during breaks and in her spare time. However, her girlfriends in the class criticize Damla's playing football and exclude her.

In this case, regarding the behavior of Damla's girlfriends towards Damla;

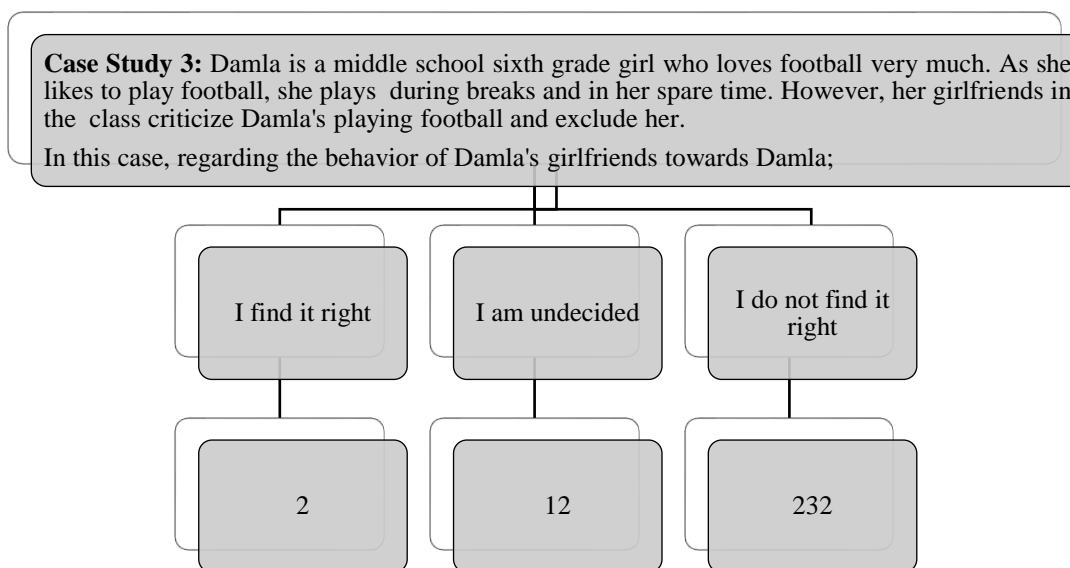| I find it right	I am undecided	I do not find it right
2	12	232

Figure 3. The answers students gave to the third case

It is seen in Figure 3 that most of the students do not find the situation in this case right. As 12 students stated they were undecided, two students found it right. The reasons students put forward were gathered under two themes: positive and negative aspects. In the positive aspects theme, there were 76 views related to gender, while 200 views were revealed as not related to gender. Through gender-related views, everyone's being able to play football regardless of gender, sports' having no gender, and there being gender equality were the views presented. In terms of non-gender-related views, everyone has different interests, showing respect for personal decisions is required, and the freedom to do whatever sport they want was indicated. For the negative aspects theme, there were 11 views related to gender, while one view was non-gender-related. Regarding gender-related views, opinions such as that girls can fall and get hurt, not finding it right for women to play football, and girls' being polite were presented. As for non-gender-related views, the necessity of sparing some time for friends was stated.

Case 4: Fatma is a very successful employee at her job. Fatma is 32 years old and has two children. Fatma successfully manages her home life and business life, and does her stuff at work without slacking off. A manager will be determined at Fatma's workplace this month. Along with Fatma, two female employees and four male employees applied to become managers. However, the owner of the workplace where they work did not accept the applications of female employees, stating that women could not be managers, and only accepted applications from male employees.

In this case, regarding the thoughts and behaviors of the owner of the workplace;

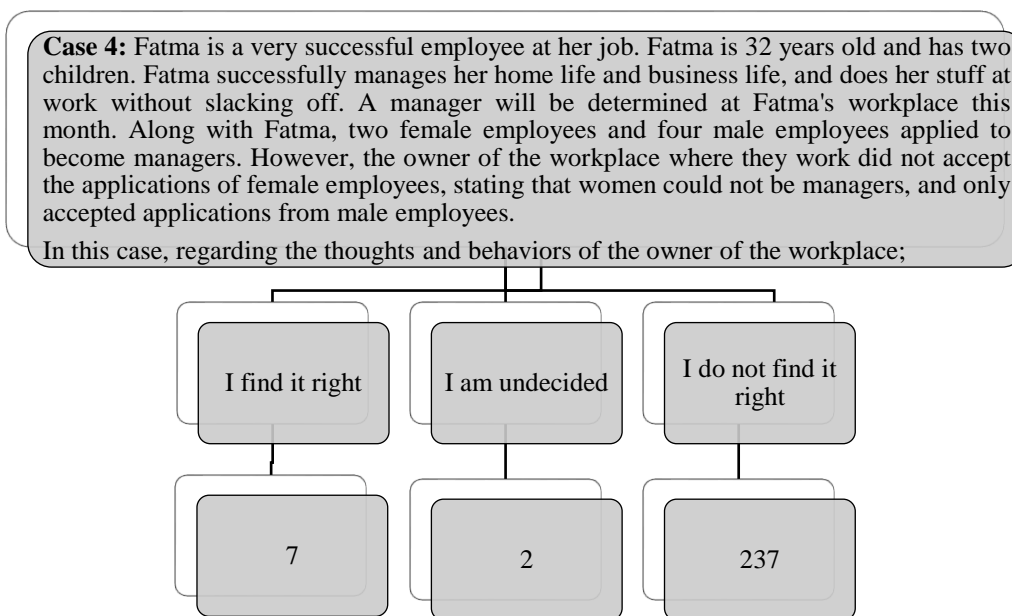| I find it right	I am undecided	I do not find it right
7	2	237

Figure 4. The answers students gave to the fourth case

As shown in Figure 4, the majority of the students do not find the situation in this case right. While two students mentioned that they were undecided, seven students found it right. The reasons put forward by students were situated in two different themes: positive and negative reasons. In the positive views theme, 271 views on gender were presented, while 43 non-gender-related views were shown. In terms of views on gender, views such as the right to promote regardless of gender, the right of women to work, and the necessity of not discriminating against gender were presented. Within the scope of non-gender-related views, opinions such as the need not to be unfair, the need to consider success in the election, and not finding it right to be biased were presented. While 13 gender-related opinions were indicated, not any gender-related views were presented with negative views. Regarding gender-related views, that it's difficult for women to have children, that it's a job only men can do, and that women's being more successful than men were the opinions stated. In this respect, a student said, *"Because women cannot be managers, it destroys us"* (S167, Boy, 6th grade). Another student said, *"Because it's ridiculous, the girl will lead better than the boy; I think it's unfair."* (S7, Girl, 8th Grade), she stated that women would be more successful than men.

Case 5: Aslı is a 16-year-old girl who continues her high school education. The village where Aslı lives is far from the nearest town where there is a high school, and in winter the roads are very dangerous due to snow. Aslı's family supports the education of girls. However, they think that Aslı is having difficulties because her high school is far away. Her family, thinking that Aslı would not fall behind in education, bought a house in the district where the high school is located and decided to live with her grandmother there.

In this case, this decision of Aslı's family;

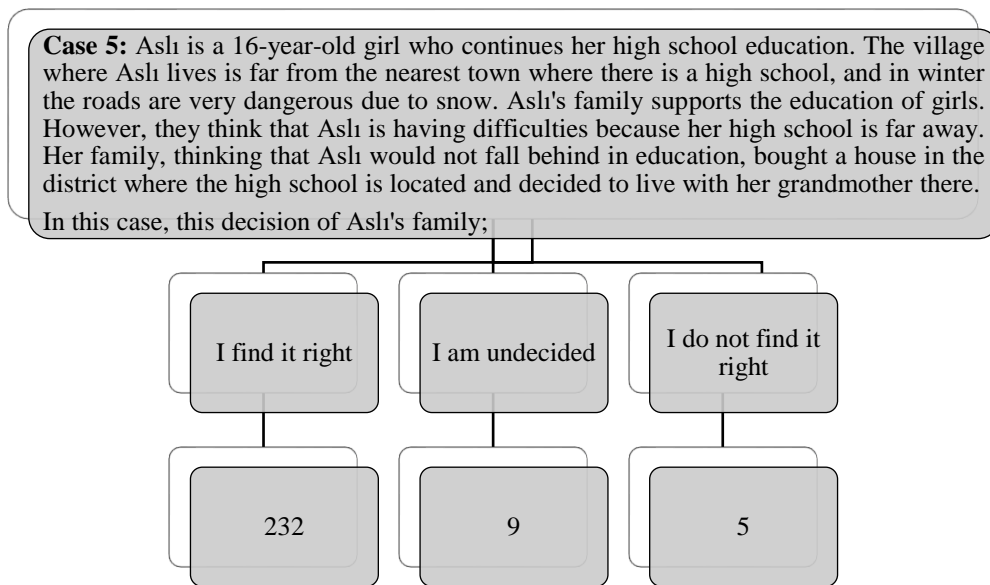| I find it right	I am undecided	I do not find it right
232	9	5

Figure 5. The answers students gave to the fifth case

It is observed in Figure 5; the majority of students find the situation in the case right. While nine students stated that they were undecided, five students found the situation correct. The reasons given by the students regarding their answers were grouped under two themes: positive reasons and negative reasons. Within positive views, there were 71 views related to gender, while 177 non-gender-related views were revealed. Regarding gender-related views, opinions such as the right of girls to education, the necessity of girls' education, and the need to support girls were presented. Within the scope of non-gender-related views, opinions such as considering education as important, having goals and dreams for everyone, and facilitating transportation were presented. In the negative views theme, while one gender-related view was indicated, four non-gender-related opinions were presented. Concerning the views on gender, the view that girls are more successful than boys was presented. Within non-gender-related views, opinions such as the fact that it doesn't matter whether she received education or not because she lives in the village, the necessity of living with her family, and the possibility of wasting the effort were presented.

Findings on Teachers' Views

Teachers' views were collected under nine themes. These themes are as follows: Views on the current situation, experienced situations, activities to raise awareness, solution suggestions, mathematics course and gender equality, science course and gender equality, information technologies course and gender equality, opinions on interdisciplinary gender equality education, opinions regarding gender equality education process. The codes in these themes and sample direct quotations related to the themes are presented below.

When the teachers' views on the current situation regarding gender equality were examined, it was determined that the students do not have awareness of gender equality (f:8), they have false awareness (f:1), and they need education on gender equality (f:8). For this theme, M1 said that *"I think they are not aware of it at all."* M3 said, *"Especially, whatever they get from the family, their family structure is different, the socioeconomic status of their families is different, everything is different. I think it is imperative that there is a curriculum in schools that will accept all differences in this regard and at least an implementation that will show them what this equality is and whether what they have received is wrong or right."* and he/she mentioned that there is a need for education on gender equality.

The teachers presented the situations related to gender inequality under four themes: situations experienced among students, situations related to family and culture, situations related to the school and education process, and situations based on knowledge and practice. When the situations among students were analyzed, it was found that they were exhibiting discriminatory behaviors towards female students, the intimidation of inequality by female students, the violent behaviors of male students, and not playing with friends of the opposite sex. Regarding this theme, S1 said, *"The thing is, male students oppress female students, and girls are used to it."* Among situations related to family and culture, some situations, such as growing up with traditional gender roles and a lack of a role

model, were stated. In the context of situations regarding school and the educational process, states such as behaving according to teachers' gender and giving place to male scientists in textbooks were mentioned. As for situations based on knowledge and practice, situations involving a lack of knowledge regarding the equality concept and supporting equality in theory but not applying it in practice were indicated. Accordingly, S3 stated, *"Now they say there is equality in name, but in practice, there is no such equality in behavior."*

Two teachers stated that they make positive discrimination for female students; three teachers, on the other hand, do nothing in order to develop gender equality awareness. About this theme, M2 stated, *"We don't do any studies as it is a math course."* As for things done for creating awareness, behaving equally while calling students to the blackboard, making opposite sexes sit side by side, talking to and warning the students about the topic, doing group projects, and teachers' being in cooperation were indicated. Concerning this theme, S3 said, *"You're actually going to raise students for a question; let a female student speak, let a male student speak; let it always be equal. In fact, even there, we make a distinction."*

Teachers presented their suggestions regarding ensuring gender equality under two themes: suggestions for education and teaching and suggestions for neighborhoods and society. Teachers made the following suggestions regarding education and teaching: Informing about gender-neutrality of professions, coherence and cooperation of school and family, including gender equality topic in courses, organizing a separate course for gender inequality, including the parents in gender equality activities, observing and empathizing for equality/inequality situations, providing information in guidance course, establishing interdisciplinary relationships, organizing conciliation training, providing information regarding girls' education, including in hidden curriculum, organizing practical educational activities, showing the significance of women in society, focusing on education more than teaching, acting with a scientific approach, destroying false beliefs and introducing woman scientists. Within this theme, I1 said, *"I think families should be informed about this issue first, because the child grows up in the family and unfortunately reflects the same in the classroom environment as he/she sees it in that environment. If there is a conflict between his father or mother, if things that put women in the background or "you are a woman, it is above your head" are instilled, unfortunately, it is very difficult to fix this situation in the school environment because the child sees it directly and applies the same in the school environment, and he does it exactly. We are observing one-to-one"* and suggested being coherent with the family in this. Besides, M3 indicated that a separate course towards gender equality should be organized by saying, *"To change this, to teach the truth of it, a course could be put on; a course with no grade value could be added. We had uttered this in a meeting; even in my former school, this problem was also there. I think a course with no grade, just like an elective course, there should be an education to tell about, to convey this or show it in behaviors."* In the context of suggestions for the living environment and society, the necessity of producing family-oriented solutions, having role models in the neighborhood, arranging television messages, and providing solutions at the social level was mentioned.

The views of mathematics teachers regarding mathematics courses and gender equality topics were presented under three themes: current situation, practicality, and problems. In relation to the current situation, two of the three mathematics teachers said that they do not associate the course with the topic of gender equality, while one teacher mentioned the presence of association in the course. Within the problems concerning gender equality, not presenting female mathematicians and thinking that the developers of mathematicians are male and mathematics teachers are not included in social-themed activities were mentioned. Regarding the applicability of associating the gender equality subject with the mathematics course, the teachers mentioned that the gender equality subject could be included in the problems, that it could be associated with the mathematics course, that it could be included in the set topic, and that it could be included in the data processing unit. On this theme, M2 indicated that the gender equality topic could be included in mathematics problems, saying, *"Within questions, for example, in problem situations, messages that indicate equality between men and women can be given. For example, we posed a problem. We read the problem and skipped it. When we include this subject in the problem, that information may remain in your mind. While solving the problem, we are placing that information in the brain; that is, we are placing it in the subconscious."*

Science teachers' opinions on science course and gender equality topics were put forward within three themes: the current situation, applicability, and problems. Teachers stated that they included gender equality topics in problems, included visuals related to women, mentioned differences, and gave project assignments against traditional gender roles within the current situation. In addition, one teacher indicated that it is difficult to associate with the science course and does not link the course with gender equality. Regarding this theme, S1 said, *"For example, we give project assignments to students; boys always want to do something about electricity, girls always want to write. I gave the girls projects about electrical circuits this year, and I said design a flashlight; I said design a caravan; a caravan is something that is always given to men; car design or something; I gave it to a female student, and she did it very well."* and mentioned that he/she gave assignments against traditional gender

roles. Through problems regarding gender equality, they indicated a lack of emphasizing the reproduction topic sufficiently and a change in curriculum and content too often. On the applicability of associating science course with gender equality topics, teachers stated that it could be included in puberty and secondary sex roles topics; it could be associated with DNA, with blood types, with reproduction in humans; it could be taught by hidden curriculum and in an interdisciplinary approach. Concerning this theme, S1 said, *"Because it is convenient, it is something that appeals to science and social field as well. The courses in social fields are not restricted to the social sciences; they could be taught to students in science course under the name of hidden curriculum."*

Information technologies teachers' views on information technologies and software courses and gender equality are presented under two themes: current situation and applicability. In the current situation, three teachers stated that they do not associate information technologies and software courses with gender equality. On the other hand, one teacher asserted that it is not situated in the curriculum. Regarding this theme, I2 stated that information technologies and software courses could not be associated with gender equality by saying, *"As this course is primarily computing literacy, also programming and algorithms, that is, it is not such a course, not a social course."* As for the applicability of associating information technologies and software courses with gender equality, teachers indicated that it could be linked with digital citizenship, with social media, with cyberbullying, there could be research on gender equality, visual design, and projects, it could be associated with computing ethics, with entrance to computing, and example videos could be watched related to gender. I1 said that it could be related to digital citizenship, saying, *"As I already said, I think it is all associated with the digital citizenship subject."*

Teachers' opinions on interdisciplinary gender equality education were gathered under two themes: positive and negative opinions. Accordingly, while eight teachers thought that it could be effective, one teacher expressed concern about its applicability. Related to this theme, I1 put forward the anxiety for the situation in the words, *"The framework plan is apparent; I have concerns about how it would be to include it in numerically weighted courses as social subjects are verbally weighted subjects."* Regarding positive opinions, it is stated that awareness towards gender discrimination could be gained, academic achievement could be increased, awareness regarding female students could be raised, affective features could be gained, it shows similarity with the STEM approach, and numerical courses could be approached from different perspectives. As for negative and abstaining opinions, views were presented that it is difficult to associate with the mathematics course, and a social studies course could also be included. Concerning this theme, I3 indicated the possible benefits of such an application, saying, *"I think that mathematics success will increase as well. Because the subjects do not attract attention, the success is always low; in this way, maybe they can attract the attention of the students."*

When teachers' opinions regarding the gender equality education process were examined, two teachers expressed their views on ensuring continuity, five teachers on the possibility of its inclusion in the fifth-sixth grade, and three teachers on the possibility of its inclusion in the seventh-eighth grade. For this theme, M1 said, *"The younger we start to gain, the more effective and successful we become. If you say middle school, it should start in the fifth grade. Since fifth graders are so innocent. Minds work terribly in eighth grade. Because their hormones absorb them. There is nothing to do. The child cannot cope with hormones. Maybe then the subject could hang in the air. The student who gets it gets it again, or the person who gets it does it again. But the younger it is given, the better."* Besides, S2 expressed her/his views as follows: *"I think that this distinction can be misunderstood for children in the fifth and sixth grades in junior grades. So in the seventh and eighth grades, it can be sprinkled at the end, the beginning, the middle, somewhere in a suitable unit."*

Conclusion and Discussion

When the findings regarding the awareness of gender equality among the students were examined, it was determined that they presented generally positive opinions about the example cases. It could be inferred that nearly all of the students do not have discriminatory views through the case of gender equality in terms of occupations. On the other hand, while the majority of students' reasons are related to gender, it is also seen that there are also many opinions that are not related to gender. Starting from this, it could be said that some of the students in the first case realized the gender inequality, while others could not. It could be indicated that most students did not have discriminatory views in the case regarding gender equality in households. However, while students present their reasons for these opinions, it is seen that they mostly put forward non-gender-related reasons. Based on this, it can be said that in the second case, the majority of the students did not address the situation in terms of gender equality. In the case regarding gender equality in terms of sports, it could be said that the majority of students did not have discriminatory opinions. Yet, it was seen that while students presented the reasons for their views, they

mostly put forward reasons that were not gender-related. In addition, it was also determined that students presented many reasons about gender as well. Starting from here, it could be indicated that most of the students could not realize the gender inequality; some could realize it in the third case. In the case of promotion in a profession, it could be asserted that the majority of students did not have discriminatory opinions. It was seen that most reasons among students were associated with gender, and there were also opinions not related to gender. Apart from this, it could be said that most students realized the gender inequalities while some did not in the fourth case. In the case of gender equality in education, it can be said that the majority of the students did not have discriminatory views. However, students usually give non-gender-related reasons for their views while also presenting gender-related views. Based on these results, it can be said that the majority of the students do not have discriminatory views in terms of gender. When the negative reasons for the case studies were examined, it was determined that the views on gender inequality related to professional promotion were the most common. Compared to other dimensions, it can be said that they mostly have gender stereotypes about professional promotion. Besides, there were also opinions about gender inequality within sports, professions, and households. In a similar study by Yolcu and Sarı (2018) with fourth graders, it was determined that students had gender stereotypes towards professions and households. However, it was observed that the majority of the reasons presented for the cases on girls' education were put forward in a way that was not related to gender. Based on these views, it was observed that the students generally did not have discriminatory views in terms of gender, but they did not handle most of the situations in the cases in terms of gender. In addition, it has been determined that some students, even a small number, have discriminatory views in terms of gender. As a result of the research based on the data obtained from the students, it can be said that the opinions expressed by the students in the case studies are generally positive, but they do not look at it from the perspective of gender equality when explaining the reasons for their opinions. This indicates that students cannot notice the situation of gender inequality in the case studies. According to teachers' views, students' awareness of gender equality is not sufficient. In similar studies conducted on this subject, it has been determined that students have deficiencies in gender equality (Acar Erdol & Gözütok, 2017; Bağçeli Kahraman & Başal, 2011; Kalaycı & Hayırsever, 2014; Kılıç, Beyazova, Akbaş, Zara & Serhatlı, 2014; Yeşil & Balcı Karaboğa, 2021; Yolcu, 2021; Yolcu & Sarı, 2018). In line with these results, it is considered necessary to develop the awareness of gender equality among students.

With respect to teachers' opinions, it was found out that students have no awareness of gender equality and need education regarding this. Besides, it was observed that there were cases of discrimination, especially among students. For example, situations such as aggression towards female students, intimidated behaviors of female students, the tendency of male students to violence, girls and boys not playing together, and grouping between genders are remarkable. Since these behaviors are related to discrimination, it is also remarkable that teachers are behaved according to their gender in school. Lastly, it is also remarkable that students are raised with traditional gender roles in families; girls do household chores while no responsibility is given to boys within the family. Based on this, it can be said that one of the sources of unequal situations at school is the family. In a study in Türkiye, it was found that gender inequality and inequality regarding disabled people were the problems most experienced in schools (Turhan Türkkan, Yolcu, & Karataş, 2017). In this context, it is stated that there are gender-based problems in schools (Trinidad, 2020). Gender equality in education is identified as a problem in Türkiye and in order to analyze and design the education of girls in Türkiye, a rich feminist environment is required (Cin & Walker, 2016). In addition to this situation, it has been determined that teachers do very superficial activities for gender equality in schools, such as treating students equally in calling them to speak, and seating girls and boys side by side. From this, it can be said that teachers do not make adequate and effective practices in this regard. With respect to this, it may be effective to get the opinions of teachers in terms of gender equality. In this research, teachers were asked about the current situation regarding gender equality, but their views on gender equality were not asked. Studies carried out in this context were generally regarding pre-service teachers. In these studies, it was determined that pre-service teachers lack knowledge in terms of gender equality; they have stereotypes and traditional gender perceptions in terms of gender (Acar Erdol, 2019; Acar Erdol, Özen & Toraman, 2019; Aslan, 2015; Aydemir, 2019; Koyuncu Şahin, Esen Çoban & Korkmaz, 2018). Accordingly, in addition to this research, teachers' perceptions of gender equality should be revealed. It is an ordinary state that a teacher does not adopt gender equality to not notice the problems through this subject and act for solutions. Besides, the teachers in this research generally put forward diverse solutions and suggestions for gender equality problems. Teachers made solution suggestions regarding education in order to create awareness for gender equality and also brought various suggestions related to the living environment and society. In this sense, the gender neutrality of professions, including the subject of gender equality in lessons, making interdisciplinary connections, organizing it as a separate course, and hidden curriculum activities, are suggestions that could be applied and be effective. In addition, recommendations such as producing family-oriented solutions and including families in activities for gender equality are also suggestions that could be effective for including the neighborhood in this process as well. It has been determined that educational practices towards gender equality reduce prejudice, stereotyping, and discriminatory views on gender and create positive outcomes in terms of gender equality (Acar Erdol, 2019;

Aydemir, 2019; Brinkman, 2009; Esen, 2013b; Kollmayer, Schultes, Lüftenegger, Finsterwald, Spiel & Schober, 2020; Özcan, 2012; Seçgin & Kurnaz, 2015; Şener Özel, 2019; Yeşil & Balcı Karaboğa, 2021; Uzun, Erdem, Güç, Şafak Uzun & Erdem, 2017; Yolcu, 2021). These studies, on the other hand, have been developed much more as a separate course or practice regarding gender equality or conducted in association with social field courses such as social studies and life sciences. In this respect, it can be said that no practice has been made to associate the subject of gender equality with the courses in the field of numeracy. The fact that many real-life problems are multifaceted and that the causes and affecting factors of real-life problems are related to more than one field shows that real-life problems are interdisciplinary (Menken & Keestra, 2016). Problems related to gender equality are also real-life problems, and therefore it is thought that addressing them in an interdisciplinary context will make significant contributions. In this research, it has been concluded that gender equality subjects can be integrated with various topics in mathematics, science, information technologies and software courses. More positive views were presented on interdisciplinary gender equality education, and interdisciplinary gender equality education can be given mostly in the fifth and sixth grades. Based on these results, it could be said that there is a need for education regarding gender equality, and it is appropriate to integrate this education with science, mathematics, information technologies and software courses. The data obtained from students in this research is limited to only one school, and the research is limited to Adana province only. For this reason, it is thought that it would be useful to examine the research in different and broader contexts.

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Author (s) Contribution Rate

The first author contributed 30%, the second author 25%, the third author 25% and the fourth author 20%.

Ethical Approval

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