UPPER ELEMENTARY MATHEMATICS CURRICULUM IN TURKEY: A CRITICAL DISCOURSE ANALYSIS

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_____

Prof. Dr. Meliha ALTUNIŞIK

Director

I certify that this thesis satisfies all the requirements as a thesis for the degree of Doctor of Philosophy.

_____

Prof. Dr. Jale ÇAKIROĞLU

Head of Department

This is to certify that we have read this thesis and that in our opinion it is fully adequate, in scope and quality, as a thesis for the degree of Doctor of Philosophy in Elementary Education.

_____

Assist. Prof. Dr. Çiğdem HASER

Supervisor

Examining Committee Members

Assoc. Prof. Dr. Erdinç ÇAKIROĞLU (METU, ELE) _____

Assist. Prof. Dr. Çiğdem HASER (METU, ELE) _____

Assoc. Prof. Dr. Cennet ENGİN DEMİR (METU, EDS) _____

Assoc. Prof. Dr. Zülbiye TOLUK UÇAR (AİBU, ELE) _____

Assoc. Prof. Dr. Hanife AKAR (METU, EDS) _____

I hereby declare that all information in this document has been obtained and presented in accordance with academic rules and ethical conduct. I also declare that, as required by these rules and conduct, I have fully cited and referenced all material and results that are not original to this work.

Name, Last name: Oğuzhan DOĞAN

Signature:

ABSTRACT

UPPER ELEMENTARY MATHEMATICS CURRICULUM IN TURKEY: A CRITICAL DISCOURSE ANALYSIS

DOĞAN, Oğuzhan

Ph.D., Department of Elementary Education

Supervisor: Assist. Prof. Dr. Çiğdem HASER

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The purpose of this study was to trace the reflections of critical issues, such as neo-liberalism, cultural differences based on social class, gender stereotyping, and nationalism in the elementary mathematics education in Turkey. Critical discourse analysis was conducted to examine these possible reflections. By researching mathematics education from a critical perspective, this study aimed to contribute constructing a starting point for socially responsible mathematics education. There were four main data sources in the study: elementary mathematics curriculum, 6^{th}, 7^{th}, and 8^{th} grade elementary mathematics textbooks, workbooks and teacher's guide books, 7^{th} grade mathematics classroom observations, and pre- and post-interviews with participant teacher.

The discourse analysis of mathematics education contexts implied that elementary mathematics discourse: (i) oriented students to use their mathematical abilities and skills for the benefit of private corporations instead of public welfare; (ii) replaced the 'real life' in mathematics problems with the life of middle and upper middle classes; (iii)

included sexist expressions; and (iv) fostered nationalism via ignoring ethnic and non-Muslim groups living in Turkey. It appeared that teachers might not be aware of such discourse. Findings have addressed that policy makers and textbook writers should consider these critical issues in order to reach all students and teachers' awareness should be increased. Future research should clarify these issues in a broad sense including pre-service teachers, teachers, students, and mathematics instruction in schools.

Keywords: Elementary mathematics education, Neoliberal education policies, Class culture, Gender Discrimination, Nationalism

ÖZ

TÜRKİYE'DE İLKÖĞRETİM MATEMATİK EĞİTİM PROGRAMI: ELEŞTİREL SÖYLEM ANALİZİ

DOĞAN, Oğuzhan

Doktora, İlköğretim Bölümü

Tez Yöneticisi: Yard. Doç. Dr. Çiğdem HASER

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Bu çalışmanın amacı, Türkiye'de ilköğretim matematik eğitimi ile neo-liberal eğitim politikaları, sosyal sınıflar arasındaki kültürel farklılıklar, cinsiyet ayrımcılığı ve milliyetçilik politikaları gibi sosyal ve politik konuların yansımalarının araştırılmasıdır. Bu yansımalar eleştirel söylem analizi ile ortaya çıkarılmaya çalışılmıştır. Böyle bir eleştirel analiz toplumsal adalet, yoksulluk ve ayrımcılık gibi konulara duyarlı bir matematik eğitiminin uygulanmasına katkı sunma potansiyeli taşımaktadır. Çalışmanın veri kaynağını, ilköğretim matematik eğitim programı, 6, 7, ve 8.sınıf matematik ders kitapları, çalışma kitapları ve öğretmen kılavuz kitapları, konu anlatımını, verilen örnekleri, sorulan soruları, öğrencilerin tartışmalarını, günlük ödevleri, proje ödevlerini içeren 7.sınıf matematik dersi gözlemleri ve katılımcı öğretmenle yapılan birebir derinlemesine görüşmeler oluşturmaktadır.

Eleştirel söylem analizi sonuçlarına göre, ilköğretim matematik eğitimi: (i) öğrencileri matematik bilgi ve becerilerini toplumsal fayda yerine özel şirketlerin yararları için kullanmaya yönlendirmekte; (ii) 'gerçek yaşam' kavramının içeriğini orta ve üst orta sosyal sınıfların yaşantısıyla doldurmakta; (iii) cinsiyet ayrımcılığına kapı aralayacak ifadeler içermekte; ve (iv) etnik ve Müslüman olmayan azınlıkları görmezden gelerek milliyetçiliği beslemektedir. Çalışmanın sonuçları öğretmenlerin böyle bir söylem hakkında farkındalık geliştirmediklerini göstermektedir. Araştırmanın sonuçları eğitim politikalarına yön verenler ve ders kitabı yazarlarının bütün öğrencilere ulaşabilmek için sosyal ve politik konuları düşünmelerinin ve öğretmenlerin farkındalıklarının arttırılmasının gerekli olduğunu göstermiştir. İleride yapılabilecek çalışmalar bu konuları öğretmen adaylarını, öğretmenleri, öğrencileri ve matematik öğretimini de içerecek daha geniş bir ölçekte incelemelidir.

Anahtar Kelimeler: İlköğretim matematik eğitimi, neo-liberal eğitim politikaları, sınıfsal farklılıklar, cinsiyet ayrımcılığı, milliyetçilik

.

To the memory of

Taylan HAKAN

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CHAPTER I

INTRODUCTION

In recent years, one of the main issues in Turkish education community has been students' low performance on both national and international examinations. The researches and discussions about this issue were mainly focusing on the possible reasons of these low performances and the possible arrangements to increase students' achievement in these examinations. The lower socio-economic conditions of students' families and their lower budget for educational spending was considered as the highest barrier against their reach of quality education and highlighted as the main reason of their low performances.

The regional, cultural, ethnic, and class differentiations in these examinations' scores, on the other hand, didn't receive much attention from education researchers. However, regional, cultural, ethnic, and class differentiations in the national examination scores could lead researchers to ask inspiring questions about the structure of our education system, such as whether Turkish education system with its content and deliverance serves equally to each members of our society or not.

Although the number of related researches and discussions were very limited for the Turkish education, the difference in educational outcomes of students coming from different race, ethnicity, class, gender, and language background were commonly researched and discussed in international education community. For many years, researchers have highlighted that public education systems did not produce equal outcomes for all students. Significant differences in students' achievements, graduation rates, and university attendance were continually observable among groups classifiable by race, ethnicity, class, gender, and language background (Gregson, 2007). These

highlighted differences have directed critical education researches to examine how class, race, and gender are represented and struggled over in schools, in education programs, textbooks, and teaching practices. The deficiencies in the representations of class, race, and gender in education materials were underlined as one of the blockades to their accessibility to high quality education (Gutstein, 2006).

In line with these arguments and observing that the content of the mathematics education was not considered adequately in the scope of these discussions, the main purpose of this study was to investigate how class, race, and gender differences are addressed in elementary mathematics education in Turkey. Parallel to this aim, this study intended to extend the understanding of the relationship between mathematics education and social and political issues (such as neoliberalism, cultural differences, gender discrimination, and nationalism), and of teachers' views about this relationship.

To clarify these relationships it should be noted that teaching mathematics is not only composed of stating some algorithms and exercising on these algorithms. The reform movements in mathematics education both in the world and in Turkey have emphasized the working on real life problems as much as these algorithms. Although there was an increasing attention on real life problems, there was still little consideration of critical real life issues, such as social justice, gender discrimination, poverty, democracy, equality, and peace in the new elementary mathematics curriculum. In this manner, this study focused on mathematics education by emphasizing its relationship with neo-liberalism, cultural differences based on social class, gender stereotyping and nationalism. Elementary mathematics curriculum, textbooks, classroom practices, and mathematics teacher's perceptions were the major areas where the researcher attempted to trace the relationship between mathematics education and critical issues.

Since mathematics education generally has not been positioned with neoliberalism, class, race, and gender issues, it would be beneficial to describe briefly what is critical pedagogy and critical mathematics education at this point. Presenting what has been

called “critical mathematics” (Frankenstein, 2006; Skovsmose, 1994) and “teaching mathematics for social justice” (Gutstein, 2003; Gutstein & Peterson, 2006) before introducing the research questions would be helpful to make sense of my rationale and motivation to conduct this study.

1.1 Critical Pedagogy; A hope for more egalitarian and just world

Critical pedagogy is one of the sociological approaches answering the question ‘why do we educate?’ Critical pedagogy claims that education, specifically schooling, is one of the ideological apparatus of the modern capitalist state and its purpose is to ensure the reproduction of capitalist social and economic relations in the society (Althusser, 2003; Blackledge & Hunt, 1985). Critical pedagogues added that this reproduction takes places by means of (a) legitimating capitalist socio-economic relations and (b) socialization of each individual so that they have the qualifications and beliefs which are appropriate for a capitalist economy (Bowles & Gintis, 1976). They also help us to discredit an educational myth of liberalism which states that education is a neutral, apolitical activity (Torres, 1998).

Critical pedagogy does not only scrutinize the role of education in the reproduction of capitalist social and economic relations but also provides some hope for the transformation of the education system, and shows an alternative pathway for educators to work with (‘not for’) students to create more egalitarian and just world (Freire, 1991). This alternative pathway is composed of two main processes: (1) developing consciousness about unjust and oppressive social and economic structure of society (and its results for the individuals); and (2) taking action to change this oppressive structure. This process of getting consciousness and taking action is also called as ‘praxis’ (Freire, 1991).

Although the role of school as legitimization and socialization was discussed in detail, there is little about the specific position of mathematics education. Moreover, there is

little about how mathematics teaching can become a tool for 'praxis'. This study will try to evaluate mathematics education with the eyes of critical pedagogues. Therefore, contemporary discussions on relationship between critical pedagogy and mathematics education will be briefly presented here before stating the purpose and problems of the study.

1.2 Critical Pedagogy and Mathematics Education

The arguments of critical pedagogy have been examined in mathematics education community. The main discussion questions were: (i) Do mathematics curriculum and textbooks reflect the oppressive characteristics of the society and the current social and cultural hegemonic structures of the society? and (i) What can be the role of mathematics education in this process of getting consciousness and taking action against this hegemony?

First, critical mathematics educators claim that whether mathematics teachers are aware of or not, teaching mathematics is not a politically blind activity (Gutstein & Peterson, 2006). They also indicate that mathematics education in schools has a "certain grammar which promotes some specific world views" (Skovsmose, 1994, p.5). Since we are living in an unjust and unequal world in terms of power, opportunities, and access to resources a mathematics curriculum or a mathematics classroom which is based on transmitting uncritical knowledge will be epistemologically oppressive and will not provide any opportunity to challenge unequal status quo (Povey, 2002).

In addition, after indicating impossibility of teaching mathematics in a neutral manner, Gutstein and Peterson (2006) tried to indicate the political character of mathematics education with the following two questions:

> A group of youth aged 14, 15 and 16 go to the store. Candy bars are on sale for 43 cent each. They buy a total of 14 candy bars. How much do they spend?

> Factory workers aged 14, 15 and 16 in Honduras make Mckids children's clothing. Each worker earn 43 cent for an hour and works 14-hour each day. How much does each worker make in one day? (p.6)

They point out that although these two questions are similar in terms of their mathematics content, they problematize different experiences and highlight different social relations.

Secondly, as indicated in the previous section, critical pedagogy claims that oppressive characteristics of the society can be overwhelmed through being conscious about this oppression and taking action against it. Critical mathematics pedagogues additionally indicated that mathematics education also can be a tool for developing this consciousness. For example, Skovsmose (1994) did not hesitate to characterize mathematics as a language. He emphasized that similar to every language, mathematics is an "instrument for knowledge development and an interpreter of social reality" (p.4).

In addition, the critical pedagogy supports that mathematics should be considered as an influential and crucial tool for understanding and changing the world rather than as a collection of disconnected rules and algorithms to be memorized. By means of mathematics, students should have a chance to deepen their understanding of important social issues, such as racism and environmental issues, as well as sexism and social class (Gutstein & Peterson, 2006).

Critical mathematics educators have demonstrated the ways of linking mathematics to social issues ranging from environmental issues to sexism (Gutstein & Peterson, 2006; Lesser & Blake, 2007). Their starting point was that when we look at environmental problems, we can explain or demonstrate them with the help of mathematics (for example, "On Earth, the major greenhouse gases are water vapor, which causes about 36–70% of the greenhouse effect (not including clouds); carbon dioxide (CO2), which

causes 9–26%; methane (CH4), which causes 4–9%; and ozone, which causes 3–7%"[1]). When we look at poverty (for example, "In 2001, 1.1 billion people had consumption levels below $1 a day and 2.7 billion lived on less than $2 a day"[2]), or violence against women (for example, "40-70% of murders of women are committed by their husband or boyfriend"[3]) mathematics have an important role for understanding the severity of these issues. We need numbers, percentages, proportions, algorithms, and formulas for better understanding of these issues. However, when we look at mathematics education, we cannot come across any of these critical issues. Critical pedagogy defended that teaching mathematics should not be separated from teaching social and environmental issues and the integration of these issues into mathematics teaching will make mathematics more meaningful and significant for children. (Gutstein & Peterson, 2006; Lesser & Blake, 2007; Skovsmose, 1994).

As a summary, two main assumptions can be drawn from this brief introduction to critical mathematics education;

1. Mathematics education (including mathematics lesson discourse, textbooks and curriculum) is not a politically blind discipline (free from political/critical issues, such as capitalism, race, gender, and equity) but tied to dominant political/cultural views in the society and to existing hegemony.
2. Mathematics education is not only for understanding some rules, applying some algorithms, and solving some mathematical problems but also for understanding critical issues in students' own cultures/life and empowering students to change them.

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[1] http://en.wikipedia.org/wiki/Global_warming

[2] http://en.wikipedia.org/wiki/Poverty

[3] http://en.wikipedia.org/wiki/Violence_against_women

The discussion of these assumptions in Turkey mathematics education community was very limited. There was almost no research that questions the political character of mathematics education and examined the possibility of teaching mathematics for social justice. This lack of attention toward the relationship between mathematics education and critical issues was the starting point of this study.

1.3 Purpose and Research Questions

The overall purpose of this study could be presented as to investigate the first assumption, 'mathematics education is not a politically blind discipline but tied to dominant political and cultural views in the society and to existing hegemony', in the case of Turkey elementary mathematics education. For the investigation of this assumption, researcher searched for whether the new elementary mathematics curriculum, textbooks, and classroom practices were coherent with dominant political, cultural, and patriarchal views in society or not, that is whether elementary mathematics education was politically blind or not.

The specific purpose of this study was to trace the reflection of neo-liberalism, cultural differences based on social class, gender stereotyping, and nationalism in the elementary mathematics education in Turkey through the analysis of curricular materials, textbooks, classroom practices, and teachers' views. Through this purpose, the following main research questions and sub-questions were formulated:

1. To what extent are elementary mathematics curriculum, elementary mathematics textbooks, and elementary mathematics classroom practices in Turkey free from political, social, cultural, and patriarchal values and views?

    i) How is the neo-liberal educational ideology reflected in the elementary mathematics curriculum, textbooks, and classroom practices?

ii) How are the different cultural values and practices of different social classes reflected and addressed in the elementary mathematics curriculum, textbooks, and classroom practices?

iii) How is the gender stereotyping reflected in the elementary mathematics curriculum, textbooks, and classroom practices?

iv) How is the nationalism reflected in the elementary mathematics curriculum, textbooks, and classroom practices?

2. What are the perceptions of mathematics teachers about the relationship between mathematics education and dominant political, social, cultural, and patriarchal values and views?

1.4 Potential Significance

One of the goals of this study was to examine whether mathematics curriculum and textbooks included political and critical issues. Studies which addressed critically the relationship between education and social issues generally focused on language, history and art courses (Asan, 2010; Helvacıoğlu, 1996; Kancı, 2007). There is little about the relationship between teaching mathematics and critical issues such as social justice, poverty and equality. Therefore, this study will enhance the discussion on the relation between education and critical issues by integrating mathematics education into this discussion.

Another goal of this study was to determine mathematics teachers' views about the relationship between mathematics education and social issues. Whether mathematics teachers think that there is a relationship or not, this study will construct some question marks in their minds about possibility of relating mathematics education with social issues. They will re-criticize the view that sees mathematics as a 'pure' course (free from any critical/political issues). It is the intention that the findings of this study will

make mathematics teachers be more careful in their classroom discourses about increasing students' consciousness of critical issues.

In addition, there was very limited number of researches which theoretically based on critical pedagogy in Turkey. This study will help to fill this gap and to arouse interest toward critical mathematics education. Increasing attention on critical pedagogy will lead valuable discussions on developing critical consciousness for more egalitarian and just world.

Critical pedagogy in general and critical mathematics education in specific have a potential to both reveal the economic and cultural reproduction processes of existing unjust structures of societies and develop consciousness about alternatives for the transformation of these unjust societies as indicated above. This study with its potential to uncover the role of mathematics education in these reproduction processes can open a valuable door for creating alternative mathematics education discourse. The possible findings of this study can provide a base for constructing class-, gender-, and culture-sensitive mathematics education texts and practices.

1.5 Definition of the Important Terms

Critical Mathematics Education

Critical mathematics can be defined as the integration of politicized themes and critically contextualized mathematics problems into the school mathematics (into the curriculum, textbooks, and classroom discourse). Critical mathematics places issues of social and political justice in the center of mathematics instruction (Frankenstein, 2006; Gutstein, 2003). In simple words, critical mathematics is "teaching mathematics for social justice." Critical mathematics adopts the pedagogical theories and practices of critical pedagogy, and tries to use mathematics as an analytical tool for examining

social injustices developing suggestions for more just and equitable social and political transformations (Gutstein and Peterson, 2006; Skovsmose, 1994).

Profit Driven Business Discourse

The textual and communicative contexts that focused on preserving and maximizing the profit of private corporations was labeled as ‘profit driven business discourse’ within the borders of this study. The contexts which showed a tendency to define educational concepts with the language of free labor market, such as to define schools as private corporations and to define students as highly individualized, self-interested, and consuming economic actors were investigated under this title.

Class Culture

‘Class culture’, in the context of this study, was used as the label of common cultural values and behaviors of social classes (Lower class/working class, middle class, and upper class/bourgeoisie). This concept was used to examine whether different cultural/social practices of different social/socio-economical classes were valued in a different way so as to provide a ground for inequalities in the mathematics education or not.

Gender Stereotyping

Gender stereotypes are commonly held beliefs about the characteristics and behavior of women and men. Gender stereotypes are not only descriptive, but also prescriptive beliefs about "how men and women should be and behave". In this study, gender stereotyping was used as the label educational contexts that foster stereotypes of social roles based on sex.

Nationalism

Nationalism is a political ideology that involves a strong identification of a group of individuals with a nation. It is difficult to mention about the one and always valid definition of nationalism but it is generally thought in a range from a flexible and more open to democratic values to rigid and closed one (Bora, 2003). Nationalism, within the borders of this study, was used as the label of educational contexts which emphasizes the uniqueness and superiority of a specific race.

1.6 The Outline of the Dissertation

Up to this point I tried to provide my rationale and motivation for conducting this study and presented the purpose and research questions of the study. The following chapter provided the reviews of the findings of related literature. Chapter 3 reported the methodology used in the study, with descriptions of the contexts, data gathering and analysis procedures, and the limitations of the study. Findings of this dissertation were presented in four main chapters. In the first findings chapter, the effect of neoliberalism on mathematics education was examined through revealing profit driven business discourse in mathematics education texts and settings. In the second finding chapter, the reflections of different cultural values and practices of different social classes in the mathematics education were presented. In the third finding chapter, the role of mathematics education in gender discrimination was presented through analyzing gender stereotyped context. In the last finding chapter, the effect of nationalism into mathematics education was analyzed through revealing nationalist and militarist discourse in mathematics education texts and settings. Lastly, the findings were summarized and in line with my conclusions, the implications for researchers, teachers, teacher educators, textbook writers and curriculum developers, and the recommendations for further researches were provided.

CHAPTER II

LITERATURE REVIEW

This chapter introduced the related literature about critical pedagogy and its application in mathematics education. The review began with development of the theory of critical pedagogy. It continued with studies which were based on critical pedagogy. Then, the theory and application of critical mathematics education followed. The literature review continued with researches about the effect of neoliberalism into educational settings, texts, and materials. After that, the studies investigating the role of class culture and cultural differences in the reproduction of social class inequalities were summarized. Next, contemporary studies focusing on gender stereotyped contexts in educational materials were presented. In the last part, researches highlighting the reflection of nationalism and militarism in the education system were reviewed.

2.1 Theoretical Development of Critical Pedagogy

To understand the development of 'critical pedagogy' as an educational theory, it will be beneficial to seek for the origins of the word 'critical'. Skovsmose (1994) argued that the origins of the meanings of 'critical' can be found in the "Critique of Pure Reason" in which Kant tries to clarify the general conditions for obtaining true knowledge. After this first appearance in Philosophy, critique gets a materialistic interpretation in the hands of Karl Marx. With Marx, a critique must try to clarify the economic, political, and ideological conditions of a capitalist society.

According to Skovsmose, 'critical' undergoes further evolution in Critical Theory, as developed by Max Horkheimer, Theodor Adorno, and Herbert Marcuse and others belonging to the Frankfurt School. Research in Frankfurt School took place as an

interdisciplinary study including, sociology, philosophy, and economy to interpret social life with the aim of finding opportunities for radical social improvements (Skovsmose, 1994). Skovsmose was not the only one indicating the roots of critical pedagogy in Frankfurt School, Darder, Baltodano and Torres (2003) also argued that critical understanding of education can be traced back to the critical social theories of Antonio Gramsci and several social theorists from the Frankfurt School including Marx Horkheimer, Theodor Adorno, and Herbert Marcuse.

Theoretical texts and studies in Frankfurt School which critically examined the social and economic structure of society brought important questions in the field of sociology, such as 'which institutions in society are responsible for the reproduction of the unequal, unjust and undemocratic structure of society?' and 'which institutions are able to provide opportunities for radical social improvements?' Adorno (1997) suggested that educational institutions have both of these roles. While they are responsible for the reproduction of existing structure of society, they also have the ability to react to the critical nature of the society. However, Adorno indicated that education itself wouldn't be able to achieve this latter role, and 'critique' and 'education' should be considered together.

The contribution of Frankfurt School provided a base for the development of a new approach to educational sociology called critical pedagogy. Education and schooling have been framed as institutions of both social reproduction and social change (Nygreen, 2005). Although, schools have the role of legitimization of existing social inequalities, they also have the potential to educate democratic citizens with the power and the will to critique and change oppressive social and economic structures (Giroux, 1983). In the critical pedagogy tradition, the relationship between school and society is twofold; schools historically reproduce the class structure in the society, however, they also are the institutions in which those structure could be transformed (Nygreen, 2005).

Paulo Freire's (1991) “Pedagogy of the Oppressed” was one of the most important contributions to the development of the critical pedagogy. In Pedagogy of the Oppressed, Freire reported his study on literacy education in peasant towns in Brazil. He tried to construct a theoretical framework aiming to empower students to think critically about their own positions in the world. His framework described an instruction in which students' present material reality was posed as a subject of study and a possible problem was analyzed for the purpose of change.

Critical pedagogues with their Marxist colleagues (Bourdiue, 1977; Bowles and Gintis, 1976; Willis, 1976) viewed meritocracy in education as an ideological cloud that make people believe in the prospect of social mobility through hard work. More specifically, they asserted that education socialized students to prepare for the social order in service to capitalism and therefore capitalist elites maintained the current imbalances in power. Schooling was not characterized as a neutral institution but as an active agent in the distribution of power and access to resources which sorted individuals into certain ranks or places within capitalism according to the class, race, and gender.

The curricula, textbooks, teachers’ and students’ views, and classroom discourses were the main data sources for the critical researches. The area of the researches differed from language courses to technology courses. Following section will introduce some examples from the researches which stand on critical pedagogy tradition.

2.2 Application of Critical Pedagogy

Much of the literature on critical pedagogy is about the theoretical underpinnings of this approach to education. Rarely, the researchers addressed how critical pedagogy was understood by teachers, how teachers effectively and ineffectively used its main concepts in their classrooms, and what the barriers that prevent its implementation were. This section will provide examples from this limited literature.

Hollstein (2006) studied on pre-service teachers' views about and understanding of critical pedagogy. He tried to examine how 10 pre-service social studies teachers defined and implemented critical pedagogy. Hollstein administered a questionnaire to the participants and conducted interviews with them. Questionnaire and interviews investigated participants' understanding of critical pedagogy. He, then, wanted 5 participants who had an understanding of critical pedagogy to prepare lesson plans through principles of critical pedagogy. After examining the interviews and lesson plans, he concluded that participating pre-service teachers were unable to correctly define and implement critical pedagogy. He added that the main misconception about critical pedagogy was that the understanding of critical pedagogy was not more than critical thinking. The participants did not emphasize on social activism for change. According to Hollstein, the main reason of this lack of understanding was insufficient training about critical pedagogy.

Kim (2006) tried to implement a critical English course. His study was a one semester-long critical research. He, as a teacher-researcher, defined the main goal of his course as students' empowerment. For reaching this goal, he created classroom discourses in which students were encouraged to work on, discuss, and write about current issues in American society. Kim described his teaching principles as:

1. Participatory: Learning and teaching are to take place through interactive and cooperative practice.
2. Situated: The materials and activities used in the classroom are to be located in students' language, events, and culture.
3. Critical: Students' critical analyses about themselves and society are to be encouraged.
4. Democratic: The participants in class are to negotiate and claim their rights.
5. Dialogic: The class consists of dialogue centered on problems and concerns posed by teacher and students.

6. Desocializing: Students are to be encouraged to participate in class as the members of a group.
7. Multicultural: The teacher and the students are to understand the complexity of the multiple cultures in society.
8. Research Oriented: The teacher and the students are to see themselves as researchers who are committed to transforming their surroundings for better learning and life using and reflecting on their learning and teaching experiences.
9. Activist: The teacher and the students empower themselves to take advantage of the possibilities (Kim, 2006, p.82)

The data sources of the study were teacher's narrative, classroom observation data, students' interviews, and students' writings. After an analysis of the classroom practices and students' writings, Kim concluded that to create an actual critical classroom setting was much more complex than as it had been theorized by critical pedagogues. He indicated that his teaching practices and students' reflections on these practices were not compatible with his intentions and goals. Although Kim's practices did not lead expected outcomes, he provided important implications for the future practices of critical pedagogy. He argued that students were not concerned about cultural and social issues and their learning process was slow. He also added that implementing effective critical classroom practices couldn't be achieved without taking into consideration students' needs and expectations.

Pardun-Johannsen (2004) used the creative drama and role play for developing the fifth grade students' awareness of social issues. The researcher, as a creative drama specialist, embedded the social issue dramas into school's existing character education program and her existing creative drama curriculum. The study lasted six months and each month students from a fifth grade classroom were introduced a social issue which was parallel to character education curriculum. The data sources of the study were student journals, classroom observations, and individual and group interviews. After

analyzing the data, Pardun-Johannsen concluded that the dramatic structure exploring social issues resulted in seven positive outcomes for students:

> 1) A greater sense of empathy, 2) a greater awareness of social issues, 3) student need and desire to know more about social issues, 4) ability to recognize, examine and question social and power structures at work in society, 5) crossing of peer group boundaries, 6) recognition that the use of drama, theatre and role-playing structured their development and aided growth in these areas and 7) significant movement toward praxis. (Pardun-Johannsen, 2004, p.i)

Such positive contributions make researcher recommend that the students should be given a chance and time to critically reflect on the issues present in our world.

Nygreen (2005) attempted to examine the real and potential role of schooling as a means of improving quality of life for high-poverty urban students and to observe the implementation of a critical pedagogy in a high-poverty urban high school. The study was an ethnographic research lasting two year. The researcher constructed a relationship with 5 graduates of the high-poverty urban high school. She conducted group meetings in which graduates reflected on their experiences in the school and how these experiences affected their lives. The researcher and the graduates prepared a critical course aiming to promote social critique and political engagement among students. The data sources of the study were the notes from the meetings and observation of critical course. Through this data, the researcher criticized the limitations of schooling in social change and identified the possibilities of critical pedagogy in these changes. She concluded that some features of a high-poverty urban high school limited the effectiveness of critical pedagogy. One of the important limiting factors was the belief that only school-based attempts would be sufficient in preparing students for a successful future and in creating socially just society. On the other hand, she emphasized that creating links between school-based critical practices and community-

based efforts (such as youth activist organizations) would strengthen these practices and efforts and would provide students with a better path to translating their critical consciousness into action.

Kravatz (2007) examined the application of critical pedagogy in three secondary schools placed in a crowded district of California. The study was a one-year-ethnography focusing on teachers' practices of critical pedagogy and conditions and circumstances that affected these practices. Data sources of the study were the observation notes from critical classroom practices and interviews with the teachers of these classrooms. Kravatz concluded that there were concrete differences in the application of critical classroom practices among the schools. The main reasons of this diversity were the structure of the school, existing community teachers, and the diversity and homogeneity of the students at these schools. He recommended that a classroom environment which would emphasize transformation rather than adaptation should be created for effective application of critical classroom practices.

Following section provided specific examples from the critical practices in mathematics lessons.

2.3 Critical Mathematics Education

Brantlinger (2007) designed a qualitative study to examine the impacts of critical mathematics education in a secondary school. He prepared a critical mathematics curriculum for his own mathematics instruction and taught according to this curriculum through one semester. He argued that critical mathematics instruction had more potential to be empowering for students than traditional mathematics instruction because it helped students to use mathematics to expand their understandings of sociopolitical conditions that affected their societies. The data sources of the study were this curriculum and videotapes from his critical mathematics lessons and from his traditional mathematics lessons. Bratlinger indicated that there was an explicit

difference in student participation in critical and traditional classroom activities. The students in critical mathematics classroom were more motivated to express their personal agency, to manage classroom activities, and to reason about mathematical algorithms. He added that although students' participation in critical mathematics changed positively, their thinking about the social, economic, and political issues did not differentiate. For example, he stated that students in the critical mathematics classrooms believed that rich people were wealthier mainly because they simply spent more effort in educational and financial arenas compared to poor ones. Bratlinger criticized the deficient curricular sources for critical mathematics and concluded that there was a need to develop a database to overcome this deficiency.

Gregson (2007) also contributed to the empirical research on critical mathematics practices. She observed the classroom practices of an experienced 8th grade mathematics teacher who made an effort to combine equity and mathematics education. The tensions and difficulties this teacher faced while she sought to make her practice more critical were the main focus of the study. The data sources of the study were the field notes from classroom observations and interviews with the teacher. Gregson argued that the main tension that teacher faced was the one between the desire to implement critical mathematics projects and school's goal of college preparation. She, then, concluded that it was not sufficient to implement critical methodology or curriculum in only a few mathematics classrooms. Rather, there should be school-wide efforts to connect education with equity, social justice, and social change.

Gutstein (2003) also reported on a 2-year study about teaching and learning mathematics for social justice in an urban school in a working class district. He, as a teacher-researcher, taught his class from seventh to eighth grade. He presented his teaching objectives as in Table 2.1.

Table 2.1 Objectives for Critical Mathematics Education (Gutstein, 2003, p. 44)

Goals of Teaching for Social Justice	**Specific Mathematics-Related Objectives**
Develop Sociopolitical Consciousness	Read the World Using Mathematics
Develop Sense of Agency	Develop Mathematical Power
Develop Positive Social/Cultural Identities	Change Dispositions Toward Mathematics

The data sources of the study were the observations of students' work and attitudes in the classroom, interviews with students, students' mathematical work and writings on the real-world projects, and students' own reports in their journals. Based on students' writings and work on the real-world projects, Gutstein concluded that students started to read the world through using mathematics and they made sense of and learned about issues that were important for them and their communities. He added that students did not only develop understanding of social issues but also developed mathematical power by generating multiple solution methods and communicating their findings with their peers. Actually, one citation from his eight grade student summarized the results of the study:

> "With every single thing about math that I learned came something else. Sometimes I learned more of other things instead of math. I learned to think of fairness, injustices and so forth everywhere I see numbers distorted in the world. Now my mind is opened to so many new things. I'm more independent and aware. I have learned to be strong in every way you can think of it" (p.37).

Povey (2002) studied on the novice secondary mathematics teachers' thinking about integrating social justice and equity issues in mathematics education. The study was a case-study which was based on the data from structured interviews with five secondary

mathematics teachers. The teachers were asked about (1) their beliefs about the nature of mathematics, (2) how those beliefs affected their pedagogy, (3) how they explained student failure, and (4) their views on initial teacher education. Researcher used teachers' answers of these questions to interpret their views about integrating social justice to mathematics education. Povey concluded that the study provided an empirical base for the assertion that being a critical mathematics educator was related to having a particular epistemological view about the nature of mathematics. According to Povey, a critical mathematics educator should see mathematics as a "socially constructed" discourse, should view mathematical truth as "historically located, influenced by the knower and mutable", and should define the goals of teaching mathematics as "critical awareness and democratic citizenship" (p.192).

There was an emerging body of evidence claiming that social justice examples supported student engagement in mathematics classrooms. For example, Lesser (2007) designed a mathematics education program called 'Teaching Statistics Using Social Justice (TSSJ)'. In these TSSJ classrooms, students analyzed real data on issues which would have direct relevance and importance to their lives compared to most scenarios in textbooks. Lesser emphasized that students, encountering relevance to their lives in statistics classroom, were more willingly to participate in classroom activities and share their ideas with their classmates. He also highlighted that students were unlikely to view statistics as a collection of disconnected theorems after leaving the TSSJ course.

In addition, Rouncefield (1995) asserted that when students were allowed to ask real questions about real-life situations in their statistical courses; (1) their motivation to follow classroom tasks increased considerably, (2) they raised more ethical and moral question related to task, and (3) they considered related subject matter as more relevant and interesting.

2.4 Profit Driven Business Discourse

Within the last 3 decades, the valuable writings of Apple (2001; 2004), Giroux (1999; 2004), Hill (2003), and Hursh (2004 and 2005) highlighted that all components of education were under the high pressure of neoliberal ideologies.

Apple (2001) tried to underline the close relation between the neo-liberal projects in education and inequality in educational opportunities and outcomes. Apple focused on how neo-conservative and neo-liberal tendencies affected all cultural institutions, specifically schools, and how these ideologies represented schools as tools for the legitimating and reproduction of social and economic stratification. He claimed that the wider application of basic neoliberal assumptions in education contexts resulted in the domination of privatization and marketization of educational institutions. According to him, this domination was legitimated through the sublimation of performativity and enterprising individual. He specified that the expanding and intensifying domination of the discourses and practices of neoliberal policies in every section of education imposed itself as the only alternative. According to him, this domination made it harder to transform common-sense in more critical ways. Apple concluded that the application of neoliberal policies broadens the existing inequalities in educational opportunities and outcomes instead of overcoming them. He suggested that critical analysis of the effects of class, race, and gender on these policies would be a key for transforming this neo-liberal project and the actual lived realities of real schools, teachers, and students would be the only place for this analysis.

Apple (2004) also identified two interrelated proposals of neo-liberalism that have divergent effects to national curriculums; (i) “neo-liberal inspired market proposals” and (ii) “neo-liberal, neo-conservative, and middle class managerial inspired regulatory proposals” (p.12). By examining the English, U.S., New Zealand, and Scandinavian education reform experiences to expose the effects of these proposals, Apple argued that “the drastic reduction of government responsibility for social needs” and “the dramatic

expansion of the free market" (p.15) were two apparent effects of these proposals. He also claimed that the legitimization and normalization of these effects was provided by the intensive usage of free market values in education settings.

In line with Apple's arguments, Giroux (1999) pointed out the 'commercial logic' that vitalized the market-based reforms in education in the last two decades. While this commercial logic became widespread in education, schools started to educate students so as to define themselves not as conscious social actors but as conscious consumers. Giroux indicated that with this neo-liberal turn, the organization of education was no longer to construct public good but to construct a private good intended to increase the profits of investors. He argued that replacing public good with private good would result in weakening the democratic culture of society. To cite his own words "a democratic culture cannot survive unless schooling gets treated as a public good rather than a private good and today, this legacy of public discourse appears to have faded" (Giroux, 1999, p.140). Giroux, furthermore, emphasized that the education programs emerged from this corporate culture had nothing to do with critical learning. According to him, these programs tried to shape students' identities and desires only within the limits of commercial logic. He claimed that one of the pivotal attempts of this agenda was "to educate students as consumers and train young people for the jobs of the new global marketplace" (Giroux, 1999, p.141). He added that public education became a mean for constructing commodity-hungry subjects by letting students only works on consuming some products. He concluded that the neoliberal trend through which the responsibility of education was no longer to create a democracy for 'citizens' but to produce a democracy for 'consumers'.

Giroux (2004) also described the educational agenda of neo-liberal capitalism. According to Giroux (2004), neo-liberal educational policies performed two interrelated tasks; first, schools were organized to train students as the workers for service sector jobs and second, the whole education system was designed to transform students into

life-long consumers. He argued that these neo-liberal policies which defined education as a financial investment and described learning as training for the workforce devalue the meaning of the social contract, education, and citizenship. His arguments could be interpreted as making political more political. He proposed a 'public pedagogy' to challenge the ideology and practice of neo-liberalism and pronounced it as:

> Against the neo-liberal attack on all things social, cultural politics must be reclaimed as the site where dialogue, critique, and public engagement become crucial as an affirmation of a democratically configured space of the social in which the political is actually taken up and lived out through a variety of intimate relations and social formations (Giroux, 2004, p.499).

Hill's (2003; 2004) explanations of the projections of neo-liberalism for education was helpful for understanding the contemporary effects of neo-liberalism into educational institutions, settings, and texts. According to Hill (2003), neo-liberalism has a three-leg plan for education:

> 1) Business Plan for Education: This centre on socially producing labor-power (people´s capacity to labor) for capitalist enterprises,
>
> 2) Business Plan in Education: This centre on setting business ´free´ in education for profit-making,
>
> 3) Business Plan for Educational Businesses: This is a plan for British and US based Edu-businesses to profit from international privatizing activities (Hill, 2003, p.2)

Hill (2003) argued that the first one of these plans, 'The Business Plan for Education', was related to reinforce two interrelated functions of schools: a) inculcate students with the appropriate skills and attitudes for providing labour-power for capitalist enterprises and b) discipline children so as to provide their ideological compliance for capitalism. According to Hill (2004), to reinforce these functions, the language of education was extensively replaced by the language of the market in all parts of education from

classrooms to schools and from textbooks to education programs. Hill (2004) claimed that 'skill development' was so overwhelming in education that the development of 'critical thought' was practically ignored.

Hill (2003) added that the second one of these plans, 'Business Plan in Education', pointed out the tendency to make profits from education similar to other privatized public services such as healthcare. This plan focused mainly on setting business 'free' in education for profit-making – extracting profits from privately owned schools and colleges. Hill claimed that the third plan, 'Business Plan for Educational Businesses', was related to British and US based corporations attempts of selling the idea of 'privatization' to the all over the world.

Hill (2004) highlighted the association of books, banks and bullets in the process of widening neo-liberal ideology and trends in all over the world. He stated that "the banks (finance capital, together with other capitals) control the books, and where the books don't work, or reach, then bullets and bombs are used. Books, banks and bullets combine in a permanent war to control our minds in support of the global project of imperialistic and militaristic neo-liberalism" (Hill, 2004, p.515). Hill claimed that education policy was subordinated to and was part of the project of neoliberalism and the textbooks filled up with corporate culture and business-related discourse were one of the main indicators of this subordination. While listing the major trends which were observable in different countries to different degrees in contemporary global capitalism, Hill (2004) insisted that "deepening of capitalist social relations with the commodification of everyday life" (p.504) was one of these trends. Hill indicated that 'educational state apparatuses' were one of the main carriers of this trend.

Hursh (2005) investigated the general consequences of global capitalism and neo-liberalism for education policies at the local, state, and federal levels in the United States and England. Hursh (2005) indicated that neo-liberalism portrayed the 'students' as competitive and instrumentally rational individuals who could compete in the

marketplace. He argued that since the economic productivity or effective production was an absolute must for neo-liberal economy, its education perspective "becomes less concerned with developing the well-rounded liberally educated person and more concerned with developing the skills required for a person to become an economically productive member of society" (Hursh, 2005, p.5). Hursh (2005) added that to be responsive to the needs of the international marketplace, education system was organized to raise appropriately skilled and entrepreneurial citizens who were able to generate new and added economic values.

The articles reviewed above were mainly theoretical texts highlighting the general consequences of neo-liberal trends in education. The works of Porfilio and Yu (2006), Robertson (2005), Lynch's (2006), Bartlett, Frederick, Gulbrandsen, and Murillo (2002) and many others have provided specific consequences of these neo-liberal trends in different educational settings. For example, Porfilio and Yu (2006) have investigated the process of the commercialization of teacher education through a critical narrative research. The two researchers, who were also teacher educators, provided their own stories about the effects of commercialization experiences in their teacher education program. They argued that the arguments of neoliberal globalization became the dominant trend in education over the past 20 years and resulted great modifications in educational and social affairs. They inferred from their experiences that as in the every aspect of life, 'corporate culture' was gaining growing control over teacher education discourses. With their own words "a 'school as business and student as consumer' mentality has been created; it infiltrates every fabric of college life" (Porfilio and Yu, 2006, p.1). They summarized the wide ranging effects of the commercialization of teacher education as;

> the hiring and firing of faculty members based on market needs, the recruiting of students for profits, the creating of quick programs to maximize economic gains, the judging of professors' teaching performance according to consumers

> demands, the standardization of curriculum, instruction, and assessment for economic efficiency, and the sacrificing of the critical mission of teacher education for practical and technical training (Porfilio and Yu, 2006, p.1).

As an alternative this commercialization process, Porfilio and Yu (2006) proposed that "critical scholars, whose mission is to create democratic schools and a more just society, must broaden their collection of perspectives and methodology tools for the purpose of taking inventory of the constitutive forces that are fostering commercial logics, policies, and programs across the teacher education landscape" (Porfilio and Yu, 2006, p.10).

Robertson (2005) investigated the effects of this neo-liberal trend in a small rural public school in United States. By conducting a critical ethnographic research, Robertson tried to explain how the language of corporatism and managerialism surrounded every aspects of public education. To answer his research question "how does the public school system reinforce corporate processes that determine the perceptions of students toward themselves as well as student perceptions toward socio-economic conditions to which they are destined?" (Robertson, 2005, p.5), Robertson observed classroom practices in different subject areas and interviewed with eleven students that had graduated from the school. After indicating that the classroom experiences were broadly confined with the language of corporatism and managerialism, Robertson claimed that "pedagogy in the public school setting has all too often followed the example of the corporate model to the expense of democratic principles, freedom and critical scholarship" (Robertson, 2005, p.12). He additionally emphasized that while students were treated as consumers in school, teachers behaved as technocrats and principals worked as corporate managers. According to him, these new roles drew the frame of the educational model in neoliberal era.

Lynch (2006) presented the implications of neo-liberalism and marketisation for higher education. Lynch argued that after the neo-liberal politics had gained more power in

higher education policies, universities, instead of serving the public good, had been transformed more and more into powerful consumer-oriented corporate networks. She indicated that the transformation of universities from 'being a center of learning' to 'being a business organization with productivity targets' was inevitable consequences of this neo-liberal trend. Lynch summarized the effects of neo-liberal politics in three main heading. First, with the cultural changes observed in universities, specific topics addressing the private interest of corporations became the only valid research areas. Second, with the domination of marketisation in universities, the existence of critique and creativity were severely threatened. The position of the arts, humanities, and critical social sciences were seriously weakened in the market-oriented universities. These departments were increasingly losing their status and influences at the universities. Third, the regulation of publications, lectures and engagements were defined only according to market principles. These market-oriented regulations continuously have weakened the academic intellectuals' dialogues with public.

Additionally, Bartlett, Frederick, Gulbrandsen, and Murillo (2002) observed the emergence of national-level neo-liberal discourses which placed education and schools in the service to private corporations. They conducted an ethnographic research in North Carolina. Based on the data from 20 structured and 20 supplementary interviews conducted with local economic developers, school administrators, teachers, and parents and from observations conducted at city council meetings and school board, researchers listed the observable effects of the marketization of education in a local setting. According to them, the rise in the number of the private schools, expansion of the centralized curriculum and standardized testing, emergence of the business-organized education foundations and school-to-work programs, and over representation of the business interest and corporate culture in educational tasks were the most apparent ones of these effects. They argued that the widest and predominant influence of marketization did not come from any business project but from the dispersion of this business discourse through the educational tasks. They indicated that this business

discourse subordinated the public goals of education, such as social justice and social equity, to economic goals of corporations. Based on their observations of highly intensive business climate in classrooms and around the schools, they concluded that this neo-liberal discourse, which could be described as 'the public schools for private ends', became a hegemonic common sense.

2.5 Class Culture

The importance of class culture in educational settings was emphasized through the extensive works of Bourdieu (1977 and 1984) and Lareau (1987). Specifically the concept of 'cultural capital' proposed by Bourdieu and Passeron (1990) and their valuable work "Reproduction in Education, Society and Culture" constructed a framework for investigating whether different cultural practices of different social classes were valued in a different way in educational institutions or not.

As described by Bourdieu (Bourdieu, 1977, 1984; Bourdieu and Passeron, 1990), cultural capital was the vehicle through which background inequalities in students' life were translated into differential academic rewards. The cultural capital theory argued that the culture transmitted and rewarded by the educational system reflected the culture of the dominant class. To acquire cultural capital, the student must have the capacity to receive and decode it. The acquisition of cultural capital depended on the cultural capital transmitted by the family. Consequently, the higher the social class of the family, the closer the culture it transmitted to the dominant culture and the greater the resultant academic rewards (Bourdieu, 1977; Bourdieu and Passeron, 1990).

Bourdieu (1984) argued that educational programs could not demand having same cultural backgrounds from every student. He indicated that especially linguistic and cultural competence of students were mainly determined by their families and showed significant difference in families from different social classes. He claimed that

educational settings should take into consideration of these differences to address social inequalities.

Bourdiue's (1977, 1984) theory of cultural capital proposed that if the discourse of the school, classroom, or educational texts was basically composed of middle-class culture then it might be expected that working class students would find themselves in a culturally unfamiliar setting and unable to benefit to the same extent as middle-class students. With his analysis of the relationship between social classes and education, Bourdiue highlighted that the education system substantially was controlled by socially and culturally dominant classes and so the knowledge and behaviors valued in the educational texts and rewarded in the classroom settings were the ones these classes naturally had. He argued that while the culture of working class was disregarded in education, the congruence of school culture and upper-middle class culture increased the "readiness" of upper-middle class children for school knowledge. He added that in an educational system dominated by middle and upper-middle classes, the culture of the dominant classes became the "culture" itself and the culture of lower classes was excluded from the every aspect of these educational system.

The investigations of Lareau and her colleagues (Lareau, 1987; Lareau and Horvat, 1999; Lareau and Weininger, 2003) presented meaningful applications of cultural capital concepts in educational settings. Lareau (1987) investigated the difference in family-school relationships of working-class parents and middle-class parents. Lareau conducted a qualitative study which examined parental involvement in two first-grade classrooms placed in a white working-class community and a professional middle-class community. Participant-observations of the classrooms and in-depth interviews of parents, teachers, and principals provided data for her study. After six-month observations in each school, Lareau detected that both of the schools had standardized views of the proper role of parents in schooling. However, she also inferred from her interviews that parents from different communities had unequal resources to deal with

schools' requests for parental participation. Lareau observed that although teachers in each school expressed a high desire for parental participation, the amount of participation were significantly different between the schools. She concluded that the parental participation in the middle-class school was much higher than the parental participation in the working-class school. Her comparison of the quantity and quality of the parental participation in these two schools resulted that while working class parents rarely initiated contact with teachers and mainly focused on nonacademic issues in these contacts, middle class parents contacted with teachers more frequently and focused mainly on academic issues in these contacts. Lareau exemplified the higher quality of middle class parents' parental involvement as "they carefully followed their children's curriculum and they often showed children the practical applications of the knowledge they gained at school, made up games that strengthened and elaborated children's recently acquired knowledge, and re-viewed the material presented in class with their children" (Lareau, 1987, p.78).

Lareau and Horvat (1999) also investigated parent involvements in a public elementary school in United States and tried to examine the effects of parents' social classes and races on these involvements. The participant-observations through an education year and interviews with 40 parents and 9 educators constructed the data of their study. Lareau and Horvat found that teachers could develop more positive relationship with the parents "who were deferential, expressed empathy with the difficulty of teachers' work, and had detailed information about their children's school experiences" (p.43). They, on the other hand, observed that these expected standards of teachers were difficult for some lower class (working class and poor) black families to comply with. They argued that this incompatibility with the teachers' expectations and parents' behaviors could construct social exclusion moments in educations and could result in the reproduction of existing social inequalities.

While Lareau focused on mainly the influences of cultural capital on parental involvement, the effects of students' cultural capital on their classroom participation was also studied in different settings (Foley, 2010; Forsey, 2010; Stuber. 2009). For example, Foley (2010), while investigating the rise of class culture theory in education, indicated that anthropological studies provided strong evidences of how the linguistic and cultural mismatch between home and school were quite influential in students' participation of classroom and school activities. Foley claimed that middle-class family background emerged as one of the best predictor of academic achievement in these studies. He argued that 'business models of education' and 'class-biased curriculum and pedagogical practices' were two of the basic reasons of middle-class domination in education. While such domination of middle and upper-middle classes' values favored the students from higher social classes, it punished the students from lower social classes. Foley concluded that the cultural, social, and linguistic match and mismatch between the middle-class culture of the teachers and their culturally diverse students could affect the achievement and attitude of students.

Forsey (2010) also pointed out the cultural capital as the reason of low quality communication and interaction between teachers and students. He indicated that teachers felt more comfortable with students coming from similar social background with themselves and were more likely to create classroom atmosphere in which students from middle and upper-middle class families would be favored. Forsey indicated the role of teachers in the re-production of 'middle-class culture' in and through schooling by stating "many teachers find themselves, wittingly and unwittingly, willingly and unwillingly, involved in re-producing forms and styles of schooling that suit some students very well, or well enough, and do not suit other groups of students very well, or well enough" (Forsey, 2010, p.69). He argued that, especially when the backgrounds of teachers were also shaped by the middle class values, teachers had more positive attitudes towards the middle class students who shared the similar cultures and customs with them.

Furthermore, Stuber's (2009) comparison of working class students' and upper-middle-class students' participation in the higher education setting also supported the indication of importance of cultural capital. She concluded after her comparisons that "upper-middle-class students arrive on campus with cultural resources that motivate their participation and social resources that facilitate their involvement" (Stuber. 2009, p877). She added that the social and cultural resources that working-class students brought to the classroom caused not only limited their interest in such activities but also decreased their educational gain from these activities. After observing the students coming from different social classes, she concluded that those who already possessed valued cultural and social resources had better chance to comply with educational texts and classroom activities.

Cavieres's (2011) investigation of the education reform in Chile pointed out the risk of overlooking of working class culture in the education program. Cavieres analyzed the Chilean education reform movement in terms of its call for "the respect toward the cultural differences among social groups in schools", "the inclusion of students' personal experiences within their learning" and "the integration of a notion of cultural pluralism within educational policies" (Cavieres, 2011, p.112). His analysis indicated that the education reform had a tendency to overlook the culture of low-income working class students and had the danger of marginalizing these students in the educational system. Cavieres pointed out the 'neoliberal model' that guided the reform movement as the reason of these tendencies. He claimed that the neoliberal alterations implemented since the nineties in the economic, cultural, and educational areas brought social, economic, and cultural exclusion for lower social classes. It worth to quote Cavieres's conclusions on the education reform:

> Although the reformers recognize the importance of student's cultural backgrounds, at the same time they emphasize educational practices based on competition, individualism, and accountability that divide students based on academic and class

> lines, as well as exclude those cultural experiences of students from urban low-income neighborhoods not considered appropriate to the goals pursued by the reform. As a result, these students have been marginalized from the educational processes promoted in their schools (Cavieres, 2011, p.112).

After indicating the failure of education reform to increase educational opportunities for low income working class students, Cavieres (2011) proposed a socially and culturally sensitive curriculum which aimed to incorporate approaches that were focused on helping working class students to overcome their unfamiliarity with education contexts by considering their social and cultural backgrounds. He indicated that creating educational spaces in which the interests and needs of working class students were closely taken into account was the key of such culturally sensitive curriculum.

The work of Yamamoto and Brinton (2010) can be cited as an example of how these cultural background differences turned into educational outcomes. Yamamoto and Brinton (2010), investigated the effect of cultural capital on educational performance and attainment in Japanese Education system which was similar to our education in terms of "(1) a strong reliance on student assessment through standardized examinations and (2) widespread parental investment in academic tutoring and private exam preparation courses for their children" (Yamamoto and Brinton, 2010, p.67). Their analysis of cultural capital showed that the congruence between students' cultural practices and educational discourses (for example, music and arts participation with parents) was a significant predictor of educational performance and attainment.

Furthermore, Pearce, Down, and Moore (2008) investigated how middle-class values conquered the higher education and how working class students were treated in this middle-class culture domination. They pointed out that the culture, values and knowledge of the white-middle class were rewarded over all other cultures, their culture and values became normalized and perceived as 'natural', and therefore the higher education system was socially and culturally biased. By inheriting Bourdieu's cultural

capital theory, they indicated that the personal experiences/histories of working-class students did not correspond with the current discourse of higher education institutions (such as universities) and so they were more likely to feel and to be excluded. They argued that education institutions should give greater attention to understand and overcome the alienation and exclusion of the working class students.

Moreover, the effects of the disconnection between working-class children and educational settings were examined in the case of Northern Ireland (Ingram, 2009). Ingram (2009) studied school life of students coming from the disadvantaged working-class community and searched for the reasons of the negative statistical correlation between being working class and educational achievement. Ingram claimed that the cultural identity of working classes was perceived as invalid within the educational field and the cultural disjuncture between students' real lives and classroom life contributed to the alienation of working class students. She added that school culture and working-class culture were not generally coherent and while the pedagogic actions validated middle class language and behaviors most of the time, it simultaneously devalued the working-class culture.

2.6 Gender

The gender stereotyping content and delivery of the educational concepts were investigated in different subject matters in Turkey (Asan, 2006; Esen, 2007; Esen and Bağlı, 2002; Kılıç and Eyüp, 2011; Otaran, Sayın, Güven, Gürkaynak, and Atakul, 2003; Ozdogru, Aksoy, Erdogan, and Gok, 2004). These studies provided evidence on how the discourse of educational processes within the classroom contributes to the formation of gender identity and to the maintenance of socially accepted gender roles.

For example, Esen and Bağlı (2002) investigated the adult figures on the pictures in the elementary schools' 1st grade Turkish and Alphabet textbooks in terms of adult figures' actions and places, peoples and objects which they were connected with. They

conducted a descriptive content analysis with thirteen Turkish and Alphabet textbooks. According to their investigation, while female characters in the pictures were portrayed mainly with children (%63.56), with their family (%19.07), within crowd (%5.50), and alone (%2.54), male characters were portrayed mainly with children (%24.56), with their families (%22.17), within crowd (%12.74), and alone (%10.38). In addition, they showed that while female characters were portrayed in actions mainly related with their children (%50.42), related with their homes (%11.01) and related with their works (%10.59), male characters were portrayed in actions mainly related with their works (%33.96), related with their children (%19.81) and related with their homes (%1.89). They concluded from these significant differences in the representations that while women adult characters were pictured in home or home environment, male adult characters were pictured in the actions related with public and work. They also indicated that female characters were displayed primarily with their children and in actions related with their children and were pictured rarely with their workmate and in actions related to their occupations, male characters, on the other hand, were displayed primarily in their workplace and in actions related to their occupations.

In addition, Ozdogru, Aksoy, Erdogan, and Gok (2004) investigated how gender roles were represented in Turkish elementary school textbooks. They conducted a content analysis with two 3rd grades Turkish and Life Studies textbooks through the examination of occupations, social roles, and personality traits of males and females. Their analysis underlined the difference in occupational models for two genders in textbooks. Their examination demonstrated that male figures in textbooks were demonstrated in a wider range and higher level job opportunities than female figures such as an administrator or a judge over a female typist and female figures were demonstrated less as a working person and more in conventional and lower level works such as teaching, nursing, and agricultural fieldwork. Additionally, the results of their study about the family illustrations highlighted that Turkish and Life Studies textbooks provides a portrayal of patriarchal families in which fathers worked out of the home to

sustain the living of the family and mothers were responsible for within house matters such as kitchen and child-care. Their findings also pointed out that while mothers were seen mostly in loving relations with their children, fathers were portrayed as the information and economic/money source for their children. Their analysis implied that textbooks reflected the patriarchal values which put emphasis on male dominance. They proposed that since educational processes and relations were the important contributors of the reproduction of gender roles, the content and context of the education should be reformed to reorganize existing social values and to afford different socialization opportunities for the girls.

Moreover, Esen (2007) investigated the illustrations in the new ABC, Turkish language, Life Studies and Social Studies textbooks which had prepared under the framework of the curriculum reform in Turkey. She performed qualitative and quantitative scanning to reveal the gender discrimination in these textbooks. Relying on her qualitative and quantitative analysis, Esen emphasized the difference in the status of the jobs of the male and female figures in textbooks. She showed that while male figures were demonstrated in "executive, decision- maker and inspector roles, such as market manager, school principle, judge, mayor or governor", female figures were demonstrated in "low-status supportive jobs, such as sales staff and clerk working under the supervision of a male manager" (Esen, 2007, p.10). She also pointed out the high frequency of female teachers in textbooks but indicated that this situation should not be considered as a positive change in textbooks. She, on the contrary, explained this high frequency as a result of the fact that this profession was in congruence with the traditional gender roles in Turkey. In addition, similar to patriarchal structure of job demonstrations, her investigation of the families' illustrations and pictures showed that the families in textbooks was a representative of a patriarchal family. She indicated that as in the older edition of the books, reform-based textbooks also described the father figures as coming from shopping with hands full, watching television and holding the remote controller in his hand, and being responsible for working outside and financing

the living of the household. Mother figures, on the other hand, described as preparing the dinner table, dealing with their children and shopping for the needs of their home in these textbooks. Esen added that father figures was the one to whom the child consults or asks permission for something.

Furthermore, in a more recent study, Kılıç and Eyüp (2011) investigated gender stereotyping in the 6th grade of elementary schools' textbooks. They conducted a content analysis to examine two 6th grade Turkish textbooks in terms of gender roles in home setting and in occupations. The results of their analysis displayed that male figures were shown in more various jobs than female figures; in one of the two books they analyzed, while women were presented in only 3 different occupations, men were presented in 19 different occupations. In the other book, women were presented in only 8 different occupations while men were presented in 27 different occupations. They displayed that while the occupations of male figures showed diversity such as writer, teacher, civil servant, athlete, weightlifter, doctor, fishermen, woodcutter, florist, judge, tailor, governors and academician, female figures were, again, represented almost only as teacher. In addition, their analysis indicated that female characters were portrayed mainly as dealing with their children, cleaning their homes and cooking, while male characters were portrayed as providing the living of the family, dealing with their own business and repairing their homes. Kılıç and Eyüp claimed also that not only the activities were different but also the personal characteristics of women and men were also considerably different in textbooks; while women were represented as emotional, shy, vulnerable, caring, loving, enthusiastic, self-sacrificing/devoted, unstable, gossipy, helpless, a cry baby, coward, elegant and curious, men were represented as courageous, benevolent/helpful, sensitive, brave, shy, loyal, well-informed, sociable, self-confident, strong, and determined. They concluded that "in sexual roles regarding personality, women are portrayed as weak and passive and man are portrayed as strong and clever individuals" (Kılıç and Eyüp, 2011, p.130).

Additionally, Kılıç and Eyüp (2011) underlined that Turkey has signed two international treaties to develop sensitivity to gender equality in education. One of these treaties was Beijing Declaration and Platform for Action. Beijing Declaration proposed that education programs which sensitive to gender equality should be designed and applied for all education subjects and for education level. This declaration held each participant country responsible for developing educational strategies to cleanse gender-stereotyped expressions from education programs and materials. The other treaty was *Convention on the Elimination of All Forms of Discrimination Against Women* (CEDAW). Education-related article (Article 10) of this convention proposed that

> The elimination of any stereotyped concept of the roles of men and women at all levels and in all forms of education by encouraging coeducation and other types of education which will help to achieve this aim and, in particular, by the revision of textbooks and school programs and the adaptation of teaching methods.

Despite these international treaties, Kılıç and Eyüp, based on their analysis, concluded that the cleansing of the stereotyped concepts from the education programs and materials was not addressed fully.

Similarly, Çubukçu and Sivaslıgil (2007) examined the 6th grade English textbook, called 'Quick Step' in terms of sexist discourse. They conducted a content analysis for the investigation of pictures, photos and texts. Their results indicated that the number of representation of males and females were almost equal, 144 and 140 respectively. However, there were remarkable differences in terms of gender's job distribution. They represented that while women were seen in 11 different occupations in textbooks; men were seen 17 different occupations and while women were portrayed in occupations which were socially attributed to women such as teacher, nurse and cashier; men were portrayed in occupations which were socially attributed to men such as engineer, police, lawyer, bank manager and security guard. In contrary to findings of related researches,

Çubukçu and Sivaslıgil found that there was no sexist approach in the representation of leisure time activities, housework and the frequency of speech of males and females.

Supplementary to investigation of sexist discourse in textbooks, teachers' and teacher candidates' perceptions of sexism and sexist context in educational materials were investigated in recent years through different studies (Asan, 2006; Asan, 2010; Kızılaslan, 2010). For example, Asan (2006) examined the sexist context in primary schools' textbooks and the primary schools teachers' perceptions of gender stereotyping and gender discrimination. Asan conducted a content analysis for investigating the sexist context in 35 primary school textbooks and a survey for investigating the perceptions of 241 primary teachers. The analysis of teachers' perceptions demonstrated that the awareness of teachers about the gender stereotyped items in textbooks was not strong enough. She added that this lack of awareness did not show any significant difference between male and female teachers. Asan showed that teachers' perceptions of sexism in society, on the other hand, showed significant difference according to teachers' gender; female teachers' perception of sexism in society was higher than male teachers. Asan (2006) also concluded that the views of male teachers about their classroom practices and relationship with students included more discriminatory expressions than their female colleagues.

Moreover, Kızılaslan (2010) investigated how English language teaching (ELT) teacher candidates perceived gender stereotyped contexts in ELT textbooks. Kızılaslan indicated that although the number of researches investigating sexist content of ELT textbooks was adequate, there were very limited numbers of researches investigating teachers' perception of these contents. There were two phases in her study; in the first phase, two gendered texts identified by the researcher in two locally prepared ELT textbooks were distributed to the 68 senior ELT pre-service teachers (52 females and 16 males) at a state university in western Turkey and these teacher candidates were asked to identify and correct these gendered texts. In the second phase, 18 of these student

teachers were interviewed to clarify their thinking. Her interviews with the teacher candidates revealed that according to them it was necessary to avoid discussion on gender-based issues in their classrooms. Kızılaslan concluded that "most of the interviewed student teachers did not feel comfortable having class discussions on the portrayal of males and females in school texts since they perceive this option as potentially controversial and divisive" (Kızılaslan, 2010, p.3530).

The 'Gender Review in Education Turkey 2003' report that were prepared by Otaran, Sayın, Güven, Gürkaynak and Atakul (2003) and published by UNICEF were another source emphasizing the need for gender sensitive modules in both elementary education and teacher education. After indicating the insufficient data on gender issues in education, the report highlighted that it was essential to undertake continues/consistent gender analysis of education materials from curriculum to textbooks. Otaran et al (2003) claimed that these analyses could be a base for preparing future policies in modification of education programs and materials.

Additional to researches investigating Turkish case, the reports published in the Europe also emphasized the need for a positive change in education programs. 'Gender Differences in Educational Outcomes' report published by the Education, Audiovisual and Culture Executive Agency was one of these reports (Eurydice, 2010). This report evaluated the current conditions of European countries in terms of gender equality in education and tried to determine a strategic road map for enhancing gender equality in education. The report concluded that "with a few exceptions, all European countries have – or at least plan to have – gender equality policies in education" (Eurydice, 2010, p.50) but there should be more effort for enhancing and applying these plans. According to this report gender equality should be established as one of the main objectives in elementary education and should be regarded as one important overarching principle of the compulsory school curriculum. The report indicated that placing gender equality in specific programs and in specific subjects could not be sufficient; "the gender

perspective should permeate the whole curriculum and should be taken into consideration throughout all subjects and areas" (Eurydice, 2010, p.57). The report provided the expression of Maltese National Curriculum as one of the good example of the integration of gender equality into the education programs. This curriculum stated that

> Gender equality is not a theme that should be treated by the school in isolation or during the teaching of a particular subject. Equality should be an interdisciplinary theme which teachers can develop within the context of their particular subject, confronting prejudice and promoting more gender-inclusive alternatives (Eurydice, 2010, p.57).

In addition, it would be beneficial to remind the teachers' related findings of this report; "even when teachers believe that they treat their students equally, they are more likely to chastise male students and pay them more attention, while at the same time creating greater dependency in their female students" (p.29).

2.7 Nationalism

The nationalist character of the ideology of Turkish education system was discussed in different comprehensive studies (Bora, 2003; Çayır, 2009; Kancı, 2007; Kaplan, 1999; Kaya, 2009). These researches implied that the nationalist discourses in Turkish education were researched basically via (i) the absence of ethnic and religious communities' cultures in educational texts and settings and (ii) the educational texts' indication of the Turkish superiority in different areas.

For instance, Kancı (2007), in her doctoral dissertation, examined the nationalism, modernism and militarism in primary school textbooks. Kancı conducted a discourse analysis of the textbooks used in primary public education in Turkey between the years 1928 – 2000. The analysis was limited to the textbooks related to language and social sciences courses; the life sciences textbooks, Turkish language textbooks, the history

textbooks, the social studies textbooks and the family studies/knowledge textbooks. The results of her investigation implied that the discourse of the textbooks in Turkey through the history bears the trace of ethnic-racist conception of nationalism. She argued that the nation and national identity, in other words 'being Turk', was presented as the essential part of a citizenship. According to her, this brought that "certain groups of people are denigrated and discriminated against in the textbooks; differences are not welcomed, pluralism is not valued but suspected" (Kancı, 2007, p.71). In addition, Kancı indicated that the "internal others" who were not the carrier of this national identity were portrayed in the textbooks as outcasts, degenerates, and/or traitors and blamed for being indolent, cowardly, ignorant, and/or backward-minded.

Kancı (2007) also argued that although the textbooks published in the aftermath of the 1980 military coup continued to include the elements of religious and ethnic nationalisms simultaneously, the label of these concepts were different. According to her, while the name of newly-defined 'true version' of nationalism (which was constructed on the Turkish-Islamist Synthesis) was announced as 'Atatürk's nationalism', "the textbooks continued to carry the discourses of Turkish-Islamic synthesis to the masses" (Kancı, 2007, p.122).

Additionally, Kancı concluded from the militarism analysis of the textbooks that the militarist discourse was placed into the textbooks mainly through (i)"treating war as a constant in life and reducing history to a narrative of wars", (ii) "constructing the cult of national security and defense through utilizing the discourse on enemies" and the notion of threat, and (iii) "naturalizing violence together with exaltation of dying and killing in the name of the nation and homeland" (Kancı, 2007, p.259).

Furthermore, the work of Çayır (2009), investigating nationalism, national identity and 'otherness' in Turkey's new textbooks, provided results in line with the findings of Kancı's study. Çayır conducted a discourse analysis to explore the new Social Studies textbooks (grades 4 – 7) published under the recent curriculum reform. Çayır indicated

that ethnic, religious or language-related differences received no attention in the new textbooks and the culture and history of non-Turkish and non-Muslim minorities had been systematically excluded from the 'legitimate knowledge' provided by the education programs. Çayır argued that although social reforms in the context of the European Union membership procedures has provided a suitable ground for integrating ethnic minorities' cultures and identities into the education system, this integration is still considered to be a threat to national unity in Turkey. With his words "pointing out national diversity and ethnic difference in schoolbooks is still unthinkable in Turkey. The new textbooks in this sense are far from promoting an inclusive national imaginary in pupils" (Çayır, 2009, p.48).

Çayır (2009) also underlined that the universal values such as 'peace-loving', 'respect for other cultures' or 'benevolence' were presented as they were only belonged to Turkish people. He indicated that these universal ideals and values were confined to the Turkish nation in order to develop a sense of 'we'. Çayır claimed that such demonstrations and narrow-minded nationalist discourses was an example of "how even universal values can be employed not to unite people but to set the Turkish nation apart from other nations" (Çayır, 2009, p.51).

In addition, the report of Minority Rights Group International, called "Forgotten or Assimilated? Minorities in the Education System of Turkey", provided extensive examples about how minority communities were treated in Turkish education system. Kaya (2009), as a writer of these report, indicated that while distinct minorities' cultures, religions and histories were unnoticed in education system, Turkish identity and nationalism were promoted as essential principles of it. She claimed that while Turkey is historically home to many ethnic, religious and linguistic minorities, including Armenians, Assyrians, Greeks, Laz, Keldanis, Kurds and Yezidis, there is no educational text or practice which promotes the cultures of them. After the examination of the education conditions of minorities in Turkey in comparison to international

standards, Kaya argued that there is a constant discrimination and lack of tolerance in school books and education; (i) "the religions of various minorities in Turkey are not adequately covered or given equal weight to Sunni-Islam in the curriculum" and (ii) "no special events are systematically organized to introduce minorities' cultures to school children" (Kaya, 2009, p.26). The views and feelings of members of minority communities also supported this lack of tolerance. Kaya concluded from her interviews with the members of minority communities that they had the fear of that the education system works to assimilate them and ultimately their distinct identities will disappear. Kaya (2009) indicated that teachers have chance to construct a classroom environment which promote tolerance, multiculturalism and peace instead of intolerance to differences, uniform nationality and militarization of everyday lives.

With a different point of view, Kaplan (2005) contributed to the understanding of nationalist discourse in education via the detection of Turkish- Islamist turn in the educational settings after the 1980 military coup. Kaplan examined how policy makers promoted a rationalist, religious version of nationalism aligned with the Turkish-Islamic Synthesis in education programs and textbooks. Kaplan conducted a discourse analysis of 7th grade religion textbooks published following the 1980 military coup to reveal the interplay between nationalism and religious heritage in Turkish education system. Kaplan identified four central points in the textbooks that legitimate and normalize a rationalist, religious version of nationalism;

> First, that the Turkish people have an innate spiritual affinity to Islam; second, that the Turks contributed a great deal to both Islamic and world civilizations; third, that Atatürk successfully mediated and exemplified the relation between state, citizen, and religion; and fourth, that only the state-endorsed version of Islam is compatible with both nationalism and modernity (Kaplan, 2005, p.669).

He underlined that different from the previous textbooks, Mustafa Kemal Atatürk plays a central role in linking religion with science, on the one hand, and modernity with nationhood, on the other in this Turkish- Islamist education discourse.

Furthermore, Esen (2007) also interpreted the replacement of Turkish Nationalism with Ataturk's Nationalism as a tool for the legitimization of the "Turkish- Islamist synthesis" of the nationalist-conservative ideology which dominated the social and political life following the 1980 military coup. Esen claimed that 1980 coup was a crucial turning point in the education policies, as it was in many other fields in Turkey. According to her when education was surrounded by extremely nationalist and Islamist ideologies after the coup, the word "national" was placed in front of the name of all courses (for example, national history, national geography, etc.) and the name of Ataturk was used as a legitimate cover of this Turkish- Islamist domination.

2.8 Summary

There has been a growing of literature on critical understanding of education. While the theoretical contributions indicating schools' role in the reproduction of existing unequal structure of society and in the legitimization of these inequalities continued, there was an extending body of texts characterizing schools as a place where these inequalities will be critically analyzed. Particularly, Freire's "Pedagogy of the Oppressed" seemed to be a milestone in the shift from description of schools' role as a reproduction to as an empowerment. As described, the area of the researches standing on critical pedagogy tradition spread through different school's courses. In the recent years, mathematics education became one of these courses.

Researches highlighted that all components of education were under the high pressure of neoliberal ideologies. This pressure resulted in the domination of privatization and marketization of educational institutions. The intensive usage of free market values and neo-liberal languages in education settings had an important role on the legitimization

and normalization of privatization and marketization. The studies on 'cultural capital' indicated that different cultural practices of different social classes were valued in a different way in educational institutions. Especially, it was highlighted that the discourse of the school, classroom, and educational texts was basically composed of middle-class culture. While this middle class domination provided specific advantageous for middle and upper class students in school settings, it constructed a barrier for the education of working class students. The review of literature about gender stereotyping discourse highlighted that while women in textbooks were presented as housewives and generally confined into home; men in textbooks were presented as businessmen and generally portrayed in business life. In addition, while men in textbooks could have variety of occupations, women were generally portrayed as teachers and nurses. The reviewed literature about nationalism in education highlighted that the nationalist discourses in Turkish education were observed as the absence of ethnic and religious communities' cultures in textbooks and the indication of the Turkish superiority in different areas. It was concluded that ethnic, religious, or language-related differences have received no attention in textbooks.

To conclude, although this reviewed literature underlined the importance of studying critical issues, such as the effects of neo-liberalism or the influences of cultural capital, there was almost no discussion and research in Turkey. The existing Turkish literature also focused mainly on social science and language courses and mathematics education was not addressed specifically in the scope of these studies. Therefore, this study aimed to contribute this lack of critical mathematics literature in Turkey and to draw Turkish mathematics educators' attention on 'reading world with mathematics'.

CHAPTER III

METHODOLOGY

In this chapter (a) overall research design of the study, (b) the context of the study, (c) methods and procedures used to gather data, (d) methods used to analyze the data, (e) trustworthiness of the study, and (f) limitations of the study was presented.

3.1 Restatement of the Purpose and Research Questions

The overall purpose of this study could be presented as to investigate the assumption, 'mathematics education is not a politically blind discipline but tied to dominant political and cultural views in the society and to existing hegemony', in the case of Turkish elementary mathematics curriculum. For the investigation of this assumption, the researcher searched for whether the new elementary mathematics curriculum, textbooks, and classroom practices were coherent with dominant political, cultural, and patriarchal views in society or not, that is whether elementary mathematics education were politically blind or not.

The specific purpose of this study was to trace the reflection of neo-liberalism, cultural differences based on social class, gender stereotyping, and nationalism in the elementary mathematics education in Turkey through the analysis of curricular materials, textbooks, classroom practices, and teachers' views. Through this purpose, the following main research questions and sub-questions were formulated:

1. To what extent are elementary mathematics curriculum, elementary mathematics textbooks, and elementary mathematics classroom practices in Turkey free from political, social, cultural, and patriarchal values and views?

i) How is the neo-liberal educational ideology reflected in the elementary mathematics curriculum, textbooks, and classroom practices?

ii) How are different cultural values and practices of different social classes reflected and addressed in the elementary mathematics curriculum, textbooks, and classroom practices?

iii) How is the gender stereotyping reflected in the elementary mathematics curriculum, textbooks, and classroom practices?

iv) How is the nationalism reflected in the elementary mathematics curriculum, textbooks, and classroom practices?

2. What are the perceptions of mathematics teachers about the relationship between mathematics education and dominant political, social, cultural, and patriarchal values and views?

3.2 Research Design

The research questions stated above were investigated through employing critical discourse analysis of the curriculum, textbooks, classroom practices and interactions, and teachers' views. The overall research design is summarized in Figure 3.1.

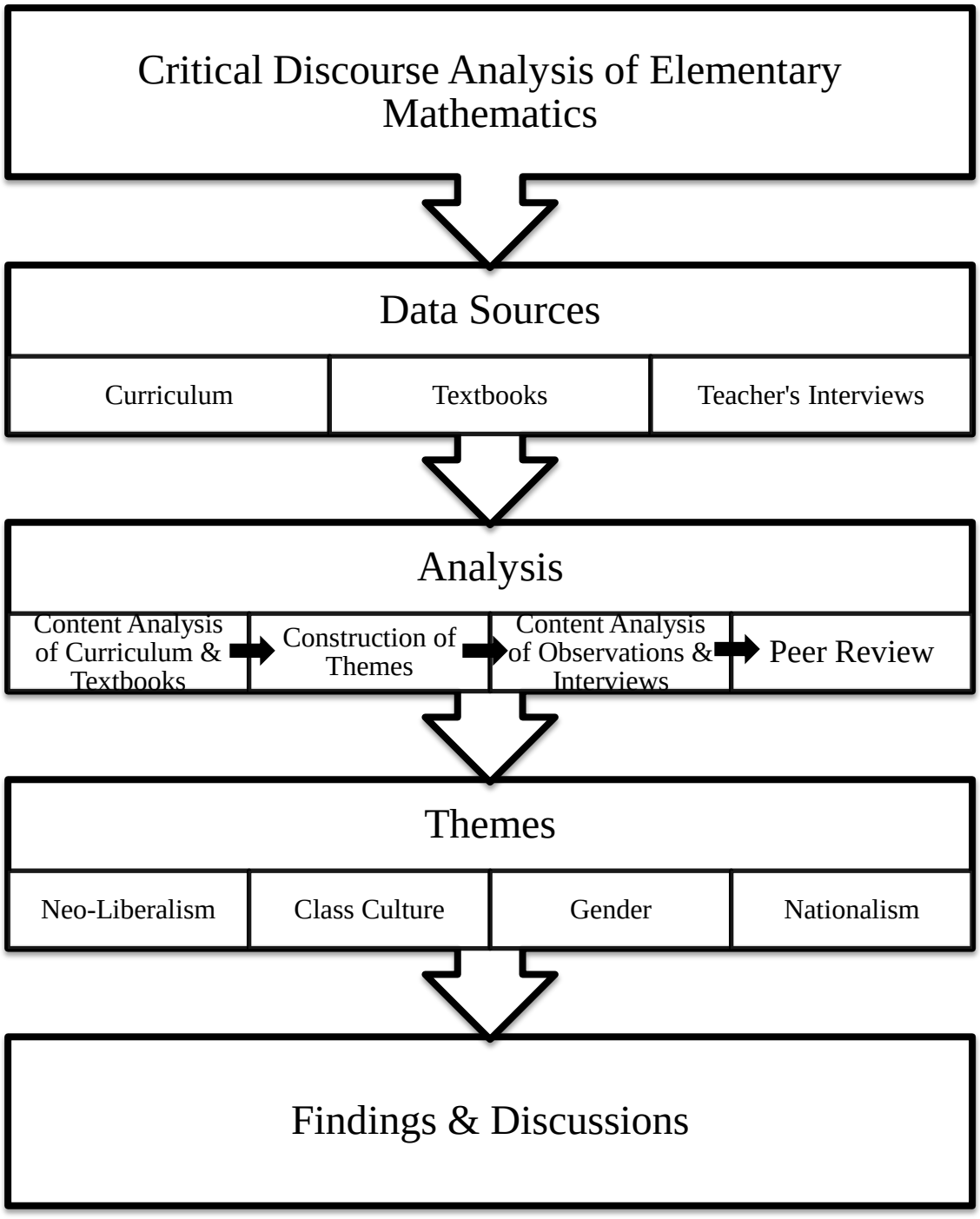

Figure 3.1 Research Design

The study employed critical discourse analysis in investigating the research questions and included curriculum documents and implementation, textbooks, and teachers interviews as data sources. The data analysis started with the content analysis of curriculum documents and textbooks. This analysis led to the construction of themes which were used for the content analysis of observations and interviews. Peer review was conducted and a certain level consistency in data analysis was observed.

The analysis yielded four themes: Neo-liberalism, class culture, gender, and nationalism. These themes, then, were addressed separately and findings related to each theme were discussed through the literature. The detailed description of the each process in research design was provided through this chapter.

3.2.1 Critical Discourse Analysis

Critical Discourse Analysis (CDA) is a type of discourse analysis research which is principally directed toward detection, description, and interpretation of different social meanings integrated in texts, talks, and other communicative contexts (Fairclough, 1992, 1995; van Dijk, 2001). Critical discourse analysts want to understand, picture, and eventually oppose social inequality. They want to know what constructions, strategies, or other properties of text, speech, verbal interaction or communicative occasions play role in the stated modes of reproduction (van Dijk, 1993, 2001). With van Dijk's own word,

> Critical discourse analysis can only make a significant and specific contribution to critical social or political analyses if it is able to provide an account of the role of language, language use, discourse or communicative events in the (re)production of dominance and inequality (van Dijk, 1993, p.279).

Language is seen by CDA as social practice, and discourse, constituting and changing our society, as interpersonal use of language (Fairclough, 1995). The fundamental idea of CDA is that all discourses, specifically institutional discourses such as classroom

discourses, are "socio-politically [and culturally] 'situated'" (van Dijk, 2001, p. 353). Knowledge, according to CDA, is never objective. There is no such thing as neutral knowledge, since any knowledge is produced by someone and is composed of subjective, ideological meanings which can be discovered and explained by means of critical analysis (van Dijk, 2001). Similarly Gee (2004) indicated that "language in use is always part and parcel of, and partially constitutive of, specific social practices, and that social practices always have implications for inherently political things like status, solidarity, distribution of social goods, and power" (p. 33).

Like knowledge, critical discourse analysts argue that discourses are naturalized for individual subjects, who are viewing the world through their own lenses and regarding their own position as 'common sense' rather than a particular construction of reality. CDA is a means for demystifying or denaturalizing these 'common sense' positions, and exposing them as discursive constructions (Locke, 2004).

CDA is considered both as a theory and a method. Researchers who are concerned about the relationship between language and society utilize CDA to help them portray, construe, and clarify this relationship (Rogers, 2004). Although there are some starting points and principles in CDA, there is no single formula for conducting CDA. Gee's (1999) and Fairclough's (1992, 1995) analytic procedures are two of the commonly used CDA methodologies in educational research (Rogers, 2004). The difference between CDA variations is derived from researchers' definition of discourse and critical, and their approach to textual analysis. Some analyses are more linguistically oriented, while others are more interested in the meanings of words in social contexts. For example, Fairclough and Wodak (1997) summarize the main tenets of CDA as follows:

1. CDA addresses social problems
2. Power relations are discursive

3. Discourse constitutes society and culture
4. Discourse does ideological work
5. Discourse is historical
6. The link between text and society is mediated
7. Discourse analysis is interpretative and explanatory
8. CDA is a form of social action. (p. 271 – 280)

Fairclough's approach to CDA highlights how a text and the ways in which it is produced or interpreted are embedded in socio-cultural practice. He mentioned three different levels for analysis: (a) the immediate situation (the local context), (b) the wider institution or organization (the institutional context), and (c) society (the societal context). For example, a lesson can be viewed (a) in terms of the interactions between teacher and students in a classroom; (b) in terms of how teacher-student interactions reflect and interpret the institutional context in which the lesson takes place; and (c) in terms of how the societal context affects and is affected by institutional context and teacher-student interactions (Fairclough, 1992, 1995)

Since how the power relations are produced, maintained, and challenged through texts and the practices is one of the main concern of CDA (Locke, 2004), it was used as a research methodology of this study. In this study, in order to analyze the data on the critical issues in elementary mathematics education, covering the grades 6 to 8, critical discourse analysis approach was used. As mentioned above, the critical discourse analysis offers theory and methods for the study of the relations between mathematics classroom discourse and critical issues in socio-cultural life. Gee's (2004), Fairclough's (1992, 1995), and Van Dijk's (2001) description of CDA provided technically strong and effective research agenda for this study.

3.3 Context of the Study

This study investigated the elementary mathematics curriculum (from 6th to 8th grade), elementary mathematics education textbooks (from 6th to 8th grade), an elementary mathematics classroom (one 7th grade classroom), and views of an elementary mathematics teacher. The detailed context of the study is provided below.

3.3.1 Turkish Elementary Education Context

Since this study has focused on 6th to 8th grade elementary mathematics education, it would be valuable to introduce basic characteristics of Turkish elementary education system. The following section would give brief information about structure of elementary school system and elementary mathematics teachers.

Primary education in Turkey is compulsory, addresses children of ages between 6 and 14, free in public schools, and is eight years since 1997. Students start their primary education at the age of six. Students are taught by the same classroom teacher in the first 5 years and by content area teachers in the last 3 years. Elementary students were taking three nationwide examinations at the end of the grades 6, 7, and 8 when the study was conducted. The scores students gain from these examinations would enable them attend to more competitive high schools. They could also attend to less competitive high schools regardless of their examination scores. High schools education is four years and students have to take a national examination in order to attend the universities. A summative picture of Turkish educational system through early childhood education to PhD degree at the time of the study is presented in Figure 3.2.

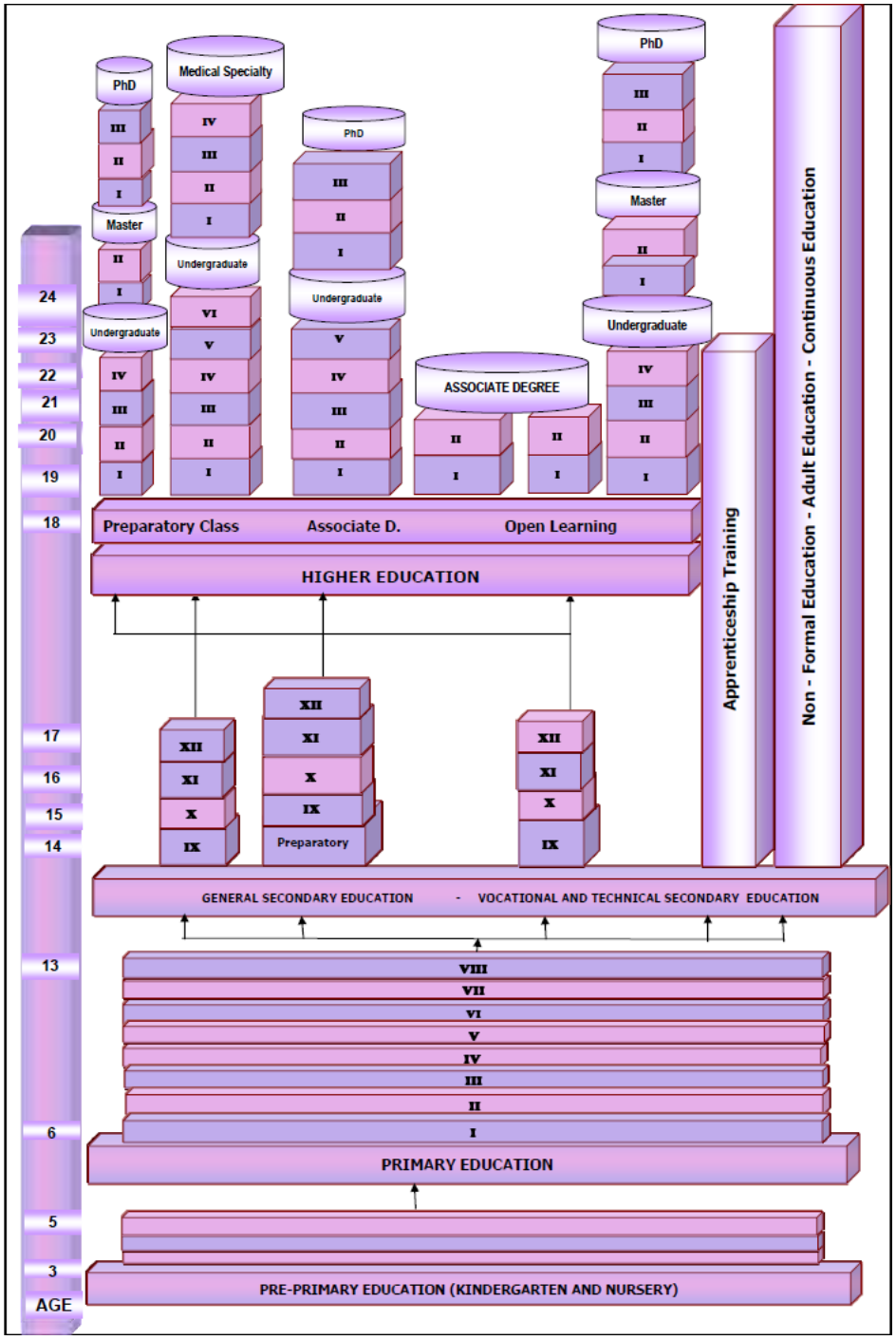

Figure 3.2 Turkish National Education System

Figure retrieved from Ministry of National Education, 2010, National Education Statistics: Formal Education 2009/2010. p.xxi

The general objectives of elementary education were determined as (a) to acquire every child with basic knowledge, skills, behaviors, and habits necessary to be a good citizen; educate them appropriately in the national moral sense, and (b) to prepare every child to upper education level by means of developing them in their interests, abilities, and talents. Specific learning outcomes, for instance assisting to get acquainted with the national and universal cultural assets, develop multi-dimensionally, use recent technologies successfully, get acquainted with the nature and protect it, learn about the techniques of accessing the knowledge, and improving scientific thinking, entrepreneurship, and creative minds were underlined in elementary education. The new elementary education curriculum identified eight fundamental fields that should be develop in all elementary students; (i) accurate, effective and fair usage of Turkish language, (ii) critical thinking, (iii) creative thinking, (iv) communication, (v) problem solving, (vi) reasoning questioning, (vii) utilization of information technologies and (viii) entrepreneurship (Eurybase, 2010; MONE, 2010).

Teacher training programs for all levels of pre-college education in Turkey are carried out by the universities. Education Faculties are the main places where teachers are trained. Pre-primary and primary education teachers graduate with bachelor's degree from 4-year programs, whereas secondary education teachers graduate from 5-year programs with master's degrees. After graduations, teacher candidates enter a national examination (KPSS) and limited number of them is hired by MONE according to their examination scores.

Schooling ratio in primary and secondary education in Turkey are 98,17% and 64,95% respectively. It can be said that there is a continuing increase in these ratios in the last decade, however the target of 100% schooling in primary education have not been achieved yet (MONE, 2010). In addition, the gap between males' and females' schooling ratios in primary education is closing after some special campaigns were organized. On the other hand, the gap between males' and females' schooling ratios in

secondary and higher education remains almost same. The schooling ratios for the last ten years are presented in Table 3.1.

Table 3.1 Schooling ratio by educational year and level of education

Education Year	Primary Education			Secondary Education			Higher Education		
	Total	Males	Females	Total	Males	Females	Total	Males	Females
1998/99	89,26	94,48	83,79	38,87	42,34	35,22	10,76	11,81	9,67
2000/01	95,28	99,58	90,79	43,95	48,49	39,18	12,27	13,12	11,38
2003/04	90,21	93,41	86,89	53,37	58,01	48,50	15,31	16,62	13,93
2006/07	90,13	92,25	87,93	56,51	60,71	52,16	20,14	21,56	18,66
2007/08**	97,37	98,53	96,14	58,56	61,17	55,81	21,06	22,37	19,69
2008/09	96,49	96,99	95,97	58,52	60,63	56,30	27,69	29,40	25,92
2009/10	98,17	98,47	97,84	64,95	67,55	62,21	-	-	-

(*) Compulsory education was expanded to 8 years as of 1997/98 educational year.

(**) The calculation of schooling ratios after was changed with 2007/08 educational year (Address-Based Population Register System Population Census was considered).

Table 3.2 provides schooling ratios from different cities of Turkey. In developed cities such as Ankara, İzmir, and İstanbul, the schooling ratio is almost 100 and the difference between males and females has nearly disappeared. On the other hand, while the schooling ratio is increasing in underdeveloped cities, the gap between male and female's schooling ratios does not show any sign of decrease.

Table 3.2 Schooling ratio in Specific Cities [Educational year 2009/10]

	Primary Education			Secondary Education		
	Total	Males	Females	Total	Males	Females
Turkey	98,17	98,47	97,84	64,95	67,55	62,21
Ankara	99,94	100,00	99,84	82,78	82,48	83,10
İstanbul	99,73	100,00	99,42	70,18	70,20	70,16
İzmir	99,36	99,44	99,27	74,51	73,34	75,74
Yozgat	90,03	90,20	89,85	54,74	59,18	50,18
Muş	94,09	94,63	93,53	28,09	35,40	20,04

There are 33 310 primary schools with 10 916 643 students and 485 677 teachers and 8913 high school with 4 240 139 students and 206 862 teachers in Turkey. While the number of female teachers is greater in primary schools, male teachers are majority in high schools. Table 3.3 gives the statistics of schools, teachers, and students.

Table 3.3 Number of schools, teachers and students [Educational year 2009/10]

		Teachers			Students		
	Schools	Total	Males	Females	Total	Males	Females
Primary Ed.	33 310	485677	232948	252 729	10916643	5632328	5284315
Public Primary	32 431	458046	224275	233771	10664676	5496195	5168481
Private Primary	879	27 631	8 673	18 958	251967	136 133	115834
Secondary Ed.	8 913	206862	120174	86 688	4 240 139	2302541	1937598

According to MONE (2010), the number of students per classroom is 32 in primary education and 33 in high schools. The average elementary classroom size is 36 for Ankara. This number is 21 for OECD countries (OECD, 2009). The number of students per school, teacher and classroom is provided in Table 3.4.

Table 3.4 Number of students per school, teacher and classroom by level of education [Educational year 2009/10]

	Primary Education			Secondary Education		
	Schools	Teachers	Classroom	Schools	Teachers	Classroom
Turkey	316	22	32	408	18	33
Ankara	602	20	36	441	15	34
İstanbul	1064	28	46	590	21	40
Van	266	31	45	481	25	39
Denizli	313	18	24	370	15	27

The general information about Turkish elementary education and teacher education, and the statistical data about the schooling and number of students in schools were provided here to construct a base for interpreting the possible findings about the social and cultural differences and discussing the possible findings related to gender issue. In addition these statistics could help to assess and interpret the current condition of participant school. The next section provided detailed information about infrastructure of participant school.

3.3.2 Participant School

The study was conducted in the second semester of 2009 – 2010 academic year at Safran Elementary School (pseudonym), a public school. The detailed description of the participant school context was presented with the help of 'Strategic Planning Report' of Safran Elementary School. This report was prepared by the school administrators for the district National Education Directorate (İlçe Milli Eğitim Müdürlüğü). The report was composed of information about school's current conditions in terms of students, teachers, parents, and physical infrastructures. The following information was inferred from this report and the occasional informal interviews with the school administrators.

The participant school, Safran Elementary School, was founded at 1963. It is placed in Seyranbağları district of Ankara and close to the city center. The school had two buildings. Building A was hosting twelve classrooms, an information technologies classroom, a library, a science laboratory, and a staff room. Building B was hosting eight classrooms, two early childhood classrooms, counseling service, and a multi-purpose conference hall.

Total number of students in the school was 607 including 296 girls and 311 boys at the time of the study. The average class size was 30. Total number of teachers was 40 with 36 female and 4 male teachers. There were two elementary mathematics teachers in the school when the study was conducted and they were female. Thirty-two of the 40 teachers in the school had been teaching for over 10 years.

Although the school was not far from the city center, the district was composed of Gecekondus (poor quality houses constructed without any proper plan and infrastructure and occupied by very low income families) and lower middle class and middle class apartments. According to school's Strategic Planning Report, most of schools' students were living in Gecekondus near the school district. The families were coming from rural areas of Ankara and near cities, and they maintained their close links to their home towns. While most of students' fathers were working at temporary jobs with minimum wages, their mothers were generally house wives.

Middle and upper middle class families living in the same district preferred to send their children to another public school which was located in a more wealthy district. Elementary schools in Ankara did not get sufficient budget from Ministry of National Education, therefore they had to increase their income through the support and donations of students' families. It can be claimed that the parents' income level determined each elementary school's financial status, educational material, technological device, and sports and music facilities. The more elementary schools get donations from families, the better infrastructure they have. Therefore, it might be

appropriate to state that Safran Elementary School's infrastructure and the opportunities they provide for students and teachers was not much sufficient.

According to School's Strategic Planning Report, 95 students graduated at the end of 2009 – 2010 education year. Nineteen of the graduates were registered to more competitive Anatolian High Schools, 36 of them were registered to Vocational High Schools, and most of the rest of the graduates registered to regular public high schools. Some of the graduates also started to work in temporary jobs such as waitress in order to support their families.

3.3.3 Participant Classroom

One of the two elementary mathematics teachers in the participant school volunteered to participate in this study. The participant classroom was selected from participant teacher's classrooms. The "mathematics in our lives" unit in 7^{th} grade curriculum directed researcher to select a 7^{th} grade classroom of participant teacher.

The participant classroom, 7-A classroom, was placed in the first floor of Building A. The class size was 28, including 15 girls and 13 boys. Specific information about students' daily life and their families' socio-economic conditions were gathered in one lesson hour in which participant teacher provided me the opportunity to ask related questions to students. I had the chance to ask students about their fathers' and mothers' occupations, their families' social and cultural conditions, and their leisure time activities.

The socio-economic conditions of the students in the participant classroom reflected the socio-economic conditions of the district in which school was placed. Students' fathers' occupations are listed in Table 3.5.

Table 3.5 Father's Occupation

Occupation	# of fathers
Driver (Taxi, Bus, Truck)	8
Civil servant	4
Construction worker	4
Small tradesmen (küçük esnaf)	4
Cleaner & Waiter	3
Unemployed	4

Other than civil servants, fathers were working with minimum wage. Only three of the mothers were working as officers, the others were housewives. In addition, parents' education level is presented in Table 3.6.

Table 3.6 Fathers' and Mothers' Education

	# of Fathers	# of Mothers
Primary School	15	20
Secondary School	6	4
High School	5	3
University	2	1

The number of children in the household differed among students' families. Five families had four children, 12 families had three children, 8 families had two children, and 3 families had one child. While eight of the families had their own house, other families were living in rented houses.

Most of the students were spending their leisure time by watching TV and playing computer games in internet cafes. While girls specifically indicated that they liked to listen to music, boys liked to play football. Students were also asked about the activities

they were doing with their families. Most of the students indicated that they only watched TV with their families. Only four students stated that they would go to the cinema or theater with their families.

3.3.4 Participant Teacher

The participant teacher, Selin (pseudonym), had been working as an elementary mathematics teacher for eight years at the time of the study. She was 30 years old and had been teaching in this school for three years. She graduated from the Elementary Mathematics Education program at Gazi University in 2002. She taught mathematics to students in 7-A when they were in the 6^{th} grade. She was married with no children and living in a flat close to the school.

3.4 Data Sources

3.4.1 Curriculum and Textbooks

The first text examined through the critical discourse analysis was the new elementary mathematics curriculum published by the MONE (2009). Initially, the vision and general objectives of elementary mathematics curriculum were analyzed for whether they reflected any political, social, cultural, and patriarchal values and views or not. Then, specific learning outcomes were investigated for whether or to what extent they addressed these critical issues. Furthermore, sample activities and lesson plans provided in the curriculum were explored in order to understand whether or to what extent they integrated these critical issues into mathematics education.

Parallel to the analysis of the curriculum, the elementary mathematics textbooks published by the Ministry of National Education were investigated for the interaction between mathematics education and these critical issues. Students' textbook, students' workbook, and teacher's guidebooks published by the MONE (2009) were examined in the context of this dissertation. The examples and problems provided by the textbooks,

sample lesson plans, and project homework in the teacher guidebooks and the exercises in the students' workbooks were the main focus and sources for the data analysis. Samples of textbooks' examples were provided in Appendix A with their translations.

3.4.2 Elementary Mathematics Classroom Practices

The discourse of elementary mathematics classroom was another data source for the critical discourse analysis for this dissertation. A 7^{th} grade mathematics classroom from Safran elementary school was observed through the second semester of 2009 – 2010 education year. Before these observations started, I had conducted pilot observations at the end of the first semester of 2009 – 2010 academic year. These pilot observations lasted for almost two months from November 2009 to December 2009. Although the observations from these lesson hours were not analyzed in this study, they were very beneficial to guide me to decide what I should and could focus on in my observations and to make me familiar with the teacher, students, and their usual practices.

The observations started in February 2010, continued to June 2010, and lasted for almost four months. The semester lasted for 12 weeks and there were 4 mathematics lessons in each week. I visited the participant school two times in a week to observe all of the mathematics lessons of 7-A classroom. Some of the lessons which were in the beginning and at the end of the semester were not in the scope of this study since they were not devoted to teach mathematics. In addition, 4 lesson hours were coincided with the national holidays and so they were not conducted. In total, 36 lesson hours were observed, audio-taped, and analyzed in the scope of this dissertation. The conversations in the mathematics lessons were audio-taped and the instructional practices were observed and noted through the whole semester. These audio-recordings of classroom interaction and the detailed description of classroom practices were combined with the homework and term projects assigned by the teacher. A sample of classroom observation data which was composed of transcription of audio-tape and observation notes was provided in Appendix B.

3.4.3 Interviews with the elementary mathematics teacher

A semi structured interview protocol was used to gather the participating teacher's views on the relationship between critical issues and mathematics education. There were two interviews with the teacher. A pre-interview was conducted after the classroom observations and before the coding of classroom observations in June 2010 and a post-interview was conducted after coding of classroom observations in January 2011.

I decided to conduct pre-interview after classroom observation so as to not influence the teacher's practices in the classroom and to have a chance to revise interview questions according to classroom observations. I prepared the pre-interview questions with the help of critical mathematics education literature and reviewed the questions with a mathematics education researcher. To test the usability of interview questions, the constructed questions were asked to another mathematics teacher working in a different public school. I revised the questions to make them more comprehensible for a mathematics teacher and constructed follow-up questions to get more detailed and inclusive answers according to this pilot interview.

I decided to conduct a post-interview after data coding procedure so as to have chance to ask the teacher about what she was thinking about my conclusions and to give a chance her to assess my interpretations of her classroom practices. The questions in the pre- and post-interviews were mainly related to teachers' perceptions about the relationship between mathematics education and dominant political, cultural, and patriarchal views and values. There were 14 main questions in the pre-interview and 10 main questions in the post-interview. The English and Turkish versions of interview questions are provided in Appendix C and D respectively.

The questions in the pre-interview were basically about teacher's general views about the relationship between mathematics education and dominant political, cultural, and

patriarchal views and values. For example, one of the pre-interview questions was about the relationship between politics and mathematics education: "When you consider mathematics education in general, such as the explanations in curriculum, examples in textbooks or activities in your classrooms, how do you assess the neutrality of these contexts in terms of political and cultural views?" Another pre-interview question addressed the relationship between patriarchal values and mathematics education: "Have you ever observed a mathematics text which treats girls and boys differently?" Post-interview questions, on the other hand, basically addressed teacher's views about my specific inferences from the curriculum, textbooks, and classroom observation analyses. For instance, one of the post-interview questions was about the gap between mathematics problems and students' cultures: "Context of some of the textbook examples seemed considerably far from the students' real life, for example, students were expected to behave as a manager in a bus company in one of the examples. What is your perception of such examples? Can you assess your examples in the classroom in terms of this perspective?"

The pre-interview was conducted in June 2010 and took almost 85 minutes. The post-interview was conducted in January 2011 and took almost 65 minutes.

3.5 Data Collection

There were three main data sources for the investigation of these research questions. The first data source of the study was the curricular materials in elementary mathematics education, such as elementary mathematics curriculum, guidelines/booklet /guide book, textbooks, and teachers' reference books for 6^{th}, 7^{th}, and 8^{th} grades published by the Ministry of National Education (MONE, 2009). The second data source was the practices and interactions including explanations, examples and questions, teacher-students interactions, homework, and projects in a mathematics classroom which were observed in the second semester of 2009-2010 academic year.

The third data source was pre- and post-interviews with the participating teacher. Mathematics teachers' views about relationship between critical issues and mathematics teaching were explored through these interviews. Table 3.7 summarized the how data sources corresponded to the specific research questions.

Table 3.7 Data Sources for Research Questions

Research Question	Data Sources
To what extent are elementary mathematics curriculum and elementary mathematics textbooks in Turkey free from political, social, cultural, and patriarchal values and views?	Elementary mathematics curriculum 6^{th}, 7^{th}, and 8^{th} grades teachers' reference books 6^{th}, 7^{th}, and 8^{th} grades textbooks, Worksheets used in mathematics classroom
To what extent are elementary mathematics classroom practices in Turkey free from political, social, cultural, and patriarchal values and views?	Observations of classroom practices and interactions including explanations, examples and questions, teacher-students interactions, homework, and projects
What are the perceptions of mathematics teachers about the relationship between mathematics education and dominant political, social, cultural, and patriarchal values and views?	Semi-structured interviews with the participating teacher

3.6 Time Table for Data Collection and Analysis

This study started in 2009. After deciding general route of the study with my advisor, I applied Research Center for Applied Ethics for the necessary permissions. This research center evaluated the research proposal and possible interview questions. After getting permissions, I applied the MONE for conducting my study in specified elementary schools. I have determined 10 candidate schools to prevent teachers' or school administrators' denial of being a participant. I communicated with one of the candidate schools, Safran Elementary School, after getting permission from MONE. Both the mathematics teacher and school administrator voluntarily accepted to participate in the study. Elementary mathematics teacher and I agreed on the classroom in which the observations would be conducted. She introduced me to her seventh grade students in 7-A classroom as a researcher and observer. The pilot observations through which I had the chance to be familiar with teacher, students, and classroom atmosphere were conducted at the end of the first semester of 2009 – 2010 education year for 7 weeks (26 lesson hour). With the start of the second semester, I began to observe each mathematics lesson of 7-A. There were 4 mathematics lessons in each week and the semester had 12 weeks. While conducting observations, I tried to collect information and for my data analysis, to construct possible code lists and themes, and to bring together the curricular materials. I also reviewed related critical mathematics education and critical discourse analysis literature to be informed about how similar data analysis was implemented. After observations were completed, I interviewed with the teacher at the end of the second semester. The interview process and protocol were described in detail above. After collecting all necessary curricular materials (Elementary mathematics curriculum, mathematics textbooks, and teacher' reference books) and constructing code list, I started the initial data analysis. I revised the code list and started to transcribe observation audiotapes. Then, the observation notes and transcriptions were coded with the revised code list. After these coding, I revisited the participant school to interview with the school administrator and to re-interview with the

participant teacher. Teacher interviews were coded in the beginning of 2011. Following the completion of coding of whole data, I re-revised the code list and asked another mathematics education researcher for re-code my data. The process described above is summarized in Table 3.8.

Table 3.8 Time Table for Data Collection and Analysis

Date	**Data collection and analysis**
September 2009	Permissions from Ethics Committee
October 2009	Participant School and teacher was determined
November – December 2009	Pilot Observations
February – June 2010	Observations
February – June 2010	Collection of curricular materials
June 2010	Pre - Interview with teachers (After observation, before data coding)
July 2010	Code list was constructed
July – August 2010	Curricular materials were coded
August 2010	Code list was revised
August – December 2010	Observation notes were coded
December 2010	Interview with school administrators
January 2011	Post-Interview with teacher (After data coding)
January 2011	Teacher interviews were coded
February 2011	Code list was revised
February – March 2011	All data was re-coded with second coder
March 2011	Results were combined

3.7 Analysis of the data

The analysis of the data started with the construction of a sample code list after the classroom observations were completed. The content of the curriculum and textbooks was analyzed with this preliminary code list. This pre-analysis resulted in some improvements in the code list. Classroom observations were coded with this improved code list. It appeared that this improved code list was sufficient to analyze the context of the classroom observations. The pre- and post-interviews with the teacher were also coded with this code list. There were some revisions in the code list after teacher's interviews were coded. With these revisions, the final code list was constructed. Up to this point, all data of the study was coded by only the researcher. After the construction of this final code list, the whole data was coded by both the researcher and another elementary mathematics education researcher to address the reliability concerns.

The coding categories and emerged code themes are presented in Table 3.9. There were four main themes in the final code list; gender, neo-liberalism, class culture and nationalism. The gender theme was composed of 6 sub-categories; mother role, father role, female occupation, male occupation, female activities, and male activities. The class culture theme included 3 sub-categories; family life, adult life, and children life. The samples of expressions and sentences which were coded in these categories and themes are provided also in Table 3.9.

Table 3.9 Code List for the Analysis of the Data

Theme	Codes/Categories	Examples
Gender	Mother Role (MR)	His mother wants Ahmet to buy the foods written in the shopping list Her mother takes her to the doctor Merve's mother will prepare sandwiches for the picnic
	Father Role (FR)	Orhan and Erhan want to share the 56 TL allowance given by their fathers Mr. Selim wants to register his daughter to the school in their new neighborhood İbrahim and İsmail want to share their father's legacy equally
	Female Occupation (FO)	Aylin Teacher Nurse Hande Author Selda
	Male Occupation (MO)	Business Owner Mr. Orhan Headmaster Remzi Dentist Suat
	Female Activities (FA)	Aysel will prepare a meal for her guests Zehra is shopping by using a credit card Selma orders 3 shirts from a catalog
	Male Activities (MA)	Mr. Ayhan usually prefer to use plane for his business Haluk wants to make a regular polygon table for his family Mehmet pays 55 kurus for his daily newspaper and 2,5 TL for his weekly journal
Neo-liberalism	Business discourse (BD)	Prepare survey questions for researching what can be done for increasing the profit of a newly opened pharmacy. Assume that you manage an ice cream shop. What type of graph will you use for showing the data on income and expense of your shop? The profit of The White Milk Company from the milk sale is seen in the given chart.

Table 3.9 Code List for the Analysis of the Data (Continued)

Class Culture	Family Life	Mert, his wife and their two children participate different activities such as theater, cinema, and exhibitions every weekend.
		Cansu takes a lot of photos in her visit to Çanakkale Cemetery on summer holiday with his family
		Esen family redecorates their house that they newly bought
	Adult Life	Mr. Ali cares for his health. He decided to buy a summer house to escape from stressful pace of everyday life
		Mr. Okan wanted to get a camera and investigated the prices of different trademarks and models of cameras
		Mr. Hasan wants to rent a car before for his summer vacation
	Children Life	The following paragraph describes the help of 6.grade students to a poor school.
		Pınar is going to French course in half of the month
		Sengul will buy fruit juice, chocolate and candies from shop for her birthday party
Nationalism	Nationalism	The Turkish people reflect their taste, aesthetics, sensuality, tolerance and practicality with the handicrafts they produced.
		By being the first Turks sportsman with such a success, he has written the name of Turkey to the world history with golden letters.
	Militarism	Have you ever observe how the soldiers walk out the official ceremonies? Their demonstrations which are done in perfect harmony make our people proud and welcomed with great enthusiasm.

The general objectives, specific learning outcomes, the vision of the elementary mathematics curriculum and sample activities and lesson plans in the curriculum, the homework projects, the examples and questions in the textbooks, the content of the

classroom activities and teacher-students interactions, and teacher's views were analyzed with this final code list by two researchers.

While coding, the researchers read each material individually and coded the critical expressions in the documents. After coding individually, they compared their codings to see whether they were parallel or not. The researchers reached over 85% agreement in assigning codes. When there were differences between the results of coding, researchers discussed the existence of a critical meaning in the statement and decided whether to include these statements in data analysis or not. The controversial statements about which researchers did not convince each other were not presented as a finding of this study. These controversial statements constructed 4% of total data coded.

3.8 Trustworthiness of the Study

Guba and Lincoln (1981, 1985) used a comprehensive term, "trustworthiness," for substituting reliability and validity in qualitative studies. Scientific research is valued by how researchers could demonstrate the trustworthiness of their findings. In all types of studies, reliability and validity of findings, which are the main determinants of the trustworthiness, are important (Golafshani, 2003; Guba & Lincoln, 1981; Morse, Barrett, Mayan, Olson & Spiers, 2002; Shenton, 2004). Based on the Guba and Lincoln's construct, Shenton (2004) described four main strategies for ensuring trustworthiness in qualitative studies; credibility (for internal validity), transferability (for external validity/generalizability), dependability (for reliability), and confirmability (for objectivity). These four aspects should be considered by qualitative researchers in search of a trustworthy study (Shenton, 2004).

In line with the Guba and Lincoln's (1981) construct, Shenton (2004) summarized the ways of addressing these four important criteria. For addressing credibility, necessary efforts should be spent on describing phenomenon/events as they actually occurred. For addressing transferability, the context of the fieldwork should be described in detail so

that the findings of the study become comparable for similar situations and transferable for similar settings. For addressing dependability, efforts should focus on describing the research process so that other researchers have a chance to replicate the research, without necessarily gaining the same findings. For addressing confirmability, researchers should ensure that the findings of the study were drawn from the data of the study. I describe my efforts to ensure the four important criteria below.

Similar to internal validity concept in quantitative studies, credibility deals with the question "How congruent are the findings with reality? Are investigators observing or measuring what they think they are measuring?" (Merriam, 1998, p.201). The first strategy applied for addressing credibility in this study was prolonged engagement. I devoted adequate time in the school and classroom environment to understand and be familiar with the culture and social setting of participant school, classroom, and teacher before the actual study started. I developed an early familiarity with the culture of participant classroom. I started to visit participant classroom about two months before conducting actual observations. I observed the student-teacher and student-student interactions in these two months. I tried to learn students' names and achievement levels. These two months pre-observations helped me not only to be familiar with students but also make them familiar with me. This familiarity provided me more chance to observe students' and teacher's natural behaviors through the actual observations. In addition, I tried to ensure trust in the participant teacher by reminding her that she could refuse to participate in any part of the study so as to ensure that the data collection sessions involved only when she was willing to take part in. Moreover, the detailed description of participant teacher's and classroom's characteristics provided above could help to communicate the actual classroom interactions that had been observed and the broader contexts around them.

Transferability of a qualitative study is related to the generalization of the findings of the study. However, in qualitative researches, generalization does not serve as

generalizing the findings of a smaller sample to the wider population because findings in qualitative studies reflect very limited number of contexts and people. Therefore, it is not much possible to explain that the findings and conclusions could be applicable to other contexts and populations (Shenton, 2004). Nevertheless, generalization refers to construct relations between similar studies in similar settings for which contextual information about the research site should be sufficiently provided so that researchers construct such relations (Lincoln & Guba, 1985). Transferability was addressed by providing systematically detailed descriptions of the participants, the research process, and data collection and analysis procedures. With the help of these information provided through the chapters, the readers could be able to identify to what extent they would implement the findings of the study and generalize those findings to similar contexts.

The dependability of this critical discourse analysis study was addressed by using a second coder. The second coder was a mathematics education researcher and was trained about analyzing the curriculum, textbooks, and classroom observation notes for social, political, cultural and patriarchal values. I described the purpose and research questions of the study to second coder in detail. I gave her an explanation of the codes list and tried to clarify the focal points of the analysis.

Data triangulation was one of the strategies for addressing confirmability of this study. The researcher tried to gather data from multiple sources; investigation of curriculum, textbooks, observations of mathematics classroom, and interviews with the teacher. While constructing the results of the study, the researcher drew conclusions from the composition of these sources of evidence.

3.9 Researcher Bias

The subjectivity of the researcher is one of the main considerations when the validity of a qualitative research considered. Whether the researcher record only what s/he wants to

see rather than what is really happening is one of the critical questions a qualitative researcher has to respond. The voice record of the classroom observations in addition to the observation notes and a second data coder could be helpful to address this critical question. Yet, it is still legitimate to claim that the interpretations of the qualitative researcher could be affected from his/her views and beliefs. Therefore it will be beneficial to present briefly my own views about education, mathematics education, and their roles in society in order to inform both myself and the other readers.

The liberal thought of education claims that education has two main functions: personal development of self and socialization of self. I completely agree with this claim, nevertheless, my understanding of what personal development and socialization mean is completely different than liberal educators. I think that 'personal development' as internalization of oppression, competition, being enterprising, and creative only when to make more profit; and 'socialization' as the accommodation to inhumane life/job conditions and adaptation to specific social roles bounded mostly with our social class, culture, gender, and race emerge as the contemporary understanding of liberal education. I believe that schools choose us, classify us, separate us, silence us, and make us blame ourselves for our conditions. With these functions, schools represent the social, political and economic system around us as 'innocent' for our conditions. In other words, schools foster the neo-liberal ideology that promotes 'blame yourself not the system' and 'change yourself not the system'.

Mathematics education, I think, is not apart from these functions, and even has important specific roles in the reproduction of social inequalities. Mathematics is an important gatekeeper in the contemporary free labor market, that is, it is a tool for separation in a modern technological world; separation of effective students who have more possibility to create more profit/surplus value. If you are good at mathematics, you will be considered as simply precious, but if you are not, you have very limited chance to change your socio-economic conditions.

However, I think mathematics could also be a tool for transforming society rather than maintaining its current status. I consider myself as one of the educators who discovers the power of mathematics as a tool for understanding social and critical issues. A critical understanding of social conditions can be possible with proper usage of mathematics education. I believe this critical understanding can help students recognize social injustices and economic disparities and encourage them to transform these conditions. I conducted this study in order to provide other mathematics educators with the current status of the Turkish elementary mathematics education in terms of critical issues by research-based findings. It might be the case that my ideas and ideals might have unconsciously influenced the interpretations of the findings; however, I tried to ensure the trustworthiness of the study by utilizing the strategies I mentioned above in order to present the most possible unbiased picture of the issue.

3.10 Limitations of the Study

There were some limitations of this study that should be documented. These limitations should be taken into consideration while interpreting the findings of the study.

First of all, the small number of participants in the current study, one school, one classroom and one teacher, resulted in limitations for the generalizability of the findings of the study. Moreover, the results of this study were limited to the data that were gathered from a public school placed in a lower social class environment. Findings should be evaluated by considering the specific classroom and school context and the broader context the school was placed.

In an attempt to investigate teacher's views about the critical issues which were investigated, only one mathematics teacher was interviewed in the current study based on observations in her 7^{th} grade mathematics classroom. Therefore, the findings of this study to portray a comprehensive picture about teachers' view on the critical issues in

the mathematics education were limited to one upper elementary grades mathematics teacher.

In addition, although the mathematics curriculum and curricular materials analyzed in this study were from 6^{th}, 7^{th}, and8^{th} grades, the observations of the current study were limited to the mathematics lessons in one semester of a 7^{th} grade classroom in the specific school.

Lastly, since the participant teacher in this study was a female teacher, there were some limitations in the interpretation of the gender-based analyses. The gender-related findings about classroom practices and teacher's views in this study should be interpreted by considering the sex of participant teacher.

CHAPTER IV

NEO – LIBERALISM

As mentioned in the previous chapter, the data of the study were gathered through the analysis of (i) elementary mathematics curriculum, (ii) students' textbook, students' workbook and teacher's guidebook, (iii) classroom observations, and (iv) teacher's pre- and post-interviews. Although it was not easy to decide how to combine the findings captured from these data, the themes emerge from the discourse analysis was helpful to organize this section of the study. The analyses lead me to present my findings into 4 main sections.

First section was related to findings about profit driven business discourse. Then, I presented the findings about class culture. Third section was about gender issue. Then, I introduced the findings on nationalist/militarist discourse. In each section, I began by giving a brief overview of the concept/theme, and then I provided how these issues were embedded into curriculum, into the curricular materials, classroom practices and lastly teacher's views.

4.1 Profit-Driven Business Discourse

With the rise of neo-liberal agenda in line with the conservative right movements in education, the status of education as a free of charge public right and the content of education as a development of independent and just society is exposed to radical changes. When considering the status of education, there is a growing effort to make each individual to compensate the cost of education. This neo-liberal agenda aims to privatize each public service, mainly education and health services, so that citizens will have to purchase this service at market value rather than have them provided by the

state. When considering the content of education, there is a growing effort to educate each individual as a labour market actor whose life and purposes are determined by their economic status. Neo-liberalism tends to define each individual in economic terms, as homo-economicus. Students will be graduated from their schools as highly individualized, self-interested and consuming economic actors. Competitive individualism is seen as a desirable and essential attribute for students rather than is an unethical necessity (Apple, 2001; Lynch, 2006).

Turkey is no exception to this trend of neo-liberalization. The defenders of this trend concentrate strongly on the role of education in servicing the economy to the neglect of its social and developmental responsibilities. The view that education is simply another market commodity has become normalized in policy and public discourses. Similar with the market's view on public education, business discourse rely on only profit-making has a growing places in educational programs, and newly defined education goals. Tracing the profit-driven business discourse in curricular materials and classroom practices was helpful to understand how neo-liberalism affects and redefine mathematics education.

4.2 Profit-Driven Business Discourse on Curriculum

When the Elementary Mathematics Curriculum was examined through the profit-driven business discourse perspective, the first concept emerged from the analysis is Entrepreneurship. In addition to the general objectives of mathematics education, such as to develop mathematical problem solving skills, to use mathematical concepts in daily life, and to have positive attitudes towards mathematics, Curriculum presented below abilities to develop.

> *The program, as in the programs of other courses (such as Turkish, Science and Technology, and Social Studies) intend to let students gain the following abilities: Critical Thinking,*

> *Creative Thinking, Communication, Research and Inquiry, Problem Solving Skills, Using Information Technologies, Entrepreneurship, and Use Turkish effectively (EME Program, p.11, 2009)*

Entrepreneurship is one of the popular concepts that neo-liberalism inserted to our glossary and it is presented as one of the common skills that mathematics should help students to develop. To remark *Entrepreneurship* in line with the abilities such as critical and creative thinking, communication and problem solving can be seen as an attempt to normalize and legitimize the vocabulary of neo-liberalism in educational discourse.

The definition of *Entrepreneurship Skills* as provided in Educational Program gives clues about the legitimization of this neo-liberal vocabulary.

> *Entrepreneurial Skills: Entrepreneurship is the required abilities; (i) to present necessary and effective behaviors that can be requested in the fields of social relationships, communication, business and other similar areas in the appropriate way and at the appropriate time or (ii) to establish a new system for a better production or marketization of a demanded product or service. Entrepreneurship includes the following sub-abilities; empathy, showing coherent behaviors in human relationships, planning, implementing plans, risk-taking; intuiting the need for a product that may be needed in any field, planning this product, producing, market researching, and marketing the product (EME Program,2009 p.12)*

According to the given definition, *Entrepreneurship* is a combination of abilities which students should have to achieve two main business-related objectives; (1) to present *effective behaviors* in business-like areas and (2) to establish a *new production and marketization* system for business. It is expected from students to use their mathematical abilities and skills for the benefit of business. The meaning of *effective behaviors* and *new system for a better production or marketization* in business discourse

is maximization of their profits. When the sub-abilities are closely analyzed, it appears that the main issue is production and marketization*: Intuiting the need for a product that may be needed in any field, planning this product, producing, market researching, and marketing the product.* Students are expected to use their knowledge to increase the profit of their company.

From the extensive works and writings of Apple (2001; 2004), Giroux (2004), Hill (2003), and Hursh (2005), we know that education programs were, are, and will be under the pressure of neoliberal agenda of education. Apple has been one of the prominent educator highlighting past, current and, possible future effects of neoliberalism into education. Apple (2001) closely attended to some of the most important dynamics surrounding neoliberalism in education. According to him, discourses of neoliberalism which composed mainly of 'privatization', 'marketization', 'performativity' and the 'enterprising individual' had a growing usage in education contexts.

In addition, while discussing the relationship between neo-liberalism and the politics of educational reform, Apple (2004) identified two interrelated proposals which have divergent effects to national curricula; (i) "neo-liberal inspired market proposals" and (ii) "neo-liberal, neo-conservative, and middle class managerial inspired regulatory proposals" (p.12). Apple examined the studies about the English, U.S., New Zealand, and Scandinavian education reform experiences to expose the effects of these proposals. The radical decrease in responsibility of government for social needs and the striking growth of the free market were the two apparent effects of these proposals. The intensive usage of free market values in education settings had roles on legitimization and normalization of these effects.

Profilio and Yu (2006) also claimed that the arguments of neoliberal globalization became the dominant trend in education over the past 20 years and resulted in great modifications in educational and social affairs. They indicated that as in the every

aspect of life, ‘corporate culture’ was gaining growing control over educational discourses. With their own words “a ‘school as business and student as consumer’ mentality has been created; it infiltrates every fabric of college life” (Porfilio and Yu, 2006, p.1).

Researchers have argued that formal education systems, mainly in the developed countries, showed increasing tendency to be shaped by the language, values and practices of the ‘free-market’ and neoliberal economy (Hursh, 2004; Manteaw, 2008). They claimed that ‘what is taught or not taught in schools’ was growingly controlled and directed by business and this was the evidence of growing ‘neo-liberal’ influence. Manteaw (2008), for instance addresses that the involvement of business in schools is not a new issue, however, there is a recent increasing emphasis on forms of certain knowledge at the cost of others knowledge forms.

The intense and combined usage of production and marketization in its explanation implies that *Entrepreneurship* is the keyword of transforming mathematics education for the interest of business instead of public welfare.

Another key point in the definition of *Entrepreneurial Skills* was usage of same vocabulary for both business and social relationships: *To present necessary and effective behaviors that can be requested in the field of social relationships, communication, business, and other similar areas.* Similarly, while defining the sub-abilities, the abilities which have a meaning in social relationships such as *empathy, showing coherent behaviors in human relationships, planning, implementing plans, and risk-taking* was also considered for business relations. This usage of vocabulary implies that the intended behaviors in social relationships and communication are identical with the business, which means that relationships in social life are reduced to business relations. This understanding is a reflection of neo-liberal thought that argue market should permeate and rule every aspects of social life; that is all social relations can be considered as a derivative of business relations. Hill (2004) claimed that “deepening of

capitalist social relations with the commodification of everyday life" (p.504) was one of these major trends in contemporary global capitalism. He indicated that 'educational state apparatuses' was one of the main carriers of this trend and capitalist social and economic relations were integrated into the all aspects of education to recompose human personality.

Robertson (2005) and Giroux (2005), while describing the impacts of neoliberal capitalism to the education system, also claimed that market relations are consistently overwhelming social relations in educational settings. Giroux (2005) claimed that democracy becomes identical to free markets and schools' and teachers' opinions are replaced by corporate ideas. Similarly, Robertson (2005) argued that although schools would serve for the good of the all people, their ideals had been being systematically replaced by business concerns entangled with individual gain.

To sum up, *Entrepreneurship* emerged as a Trojan horse of neo-liberal thoughts in mathematics education. While the intended abilities of social life, such as *communicating effectively, empathy, showing coherent behaviors in human relationships, and planning,* formed the outer shell, the profit-driven business discourse, such as to *establish a new system for a better production or marketization of a demanded product or service* composed the inner core of this Trojan horse.

The second issue that appeared in the Profit-Driven Business Discourse analysis is the emphasis on being a consumer and specifically being a conscious consumer.

> *Mathematics education should aim to develop students' abilities to use and interpret statistics correctly, to make correct predictions based on given data and decision-making so as to make students conscious citizens and consumers. (EME Program, 2009, p.7)*

Identifying the aim of mathematics education as training *conscious consumers* is directly related with the neo-liberal definition of the educated person. Neo-liberal

movement in education defines educated person as market-oriented, consuming, and self-interested (Lynch, 2006). This neo-liberal perspective ignores the fact that the majority of students and their families are not self-financing consumers. Most of the students are not and most probably will not be able to make active consumer choices due to the deficiency of their economic resources. Although an important part of mathematics education curriculum, statistic education, could be a vital medium for recognizing social inequalities in society. As Lesser (2007) indicated, statistics is an important part of mathematics education "to understand relations of power, resource inequities, and disparate opportunities between different social groups and to understand explicit discrimination based on race, class, gender, language, and other differences" (p.3). However, the broader aim of the mathematics education compressed statistics education to raising *conscious consumers.*

Lynch's (2006) description of the implications of neo-liberalism and marketization to the higher education made clear the effect of neo-liberalism on the mathematics education program. A long quotation from her would clarify the point:

> "Neo-liberalism offers a market view of citizenship that is generally antithetical to rights, especially to state-guaranteed rights in education, welfare, health and other public goods. The citizen is defined as an economic maximiser, governed by self-interest. There is a glorification of the 'consumer citizen', construed as willing, resourced and capable of making market-led choices. In this new market state, the individual (rather than the nation) is held responsible for her or his own well-being. The state's role is one of facilitator and enabler of the consumer and market-led citizen" (Lynch, 2006, p.3).

Robertson (2005) also emphasized the shift in the perception of students from individual to consumer. He indicated that this shift was not only limited to students. He, further, argued that while students were treated as consumers, teachers behaved as

technocrats and principals worked as corporate managers. According to him, this new roles drew the frame of the educational model in neoliberal era.

Giroux (1999) also pointed out the 'commercial logic' that vitalized the market-based reforms in education in the last two decades. While this commercial logic became widespread in education, schools started to educate students so as to define themselves not as conscious social actors but as conscious consumers. Giroux emphasized that the education programs emerged from this corporate culture do not promote critical learning. According to him, these programs tried to shape students' identities and aspirations only within the limits of commercial logic.

In addition, as encountered in the Entrepreneurship definition, a citizen, who is involved in social relations, is reduced to a being in a business relation, a consumer. This is another reflection of the neo-liberal understanding which argues that market should rule every aspects of social life. These findings were in line with the Giroux's (2004) description of educational agenda of neo-liberal capitalism. According to Giroux (2004), neo-liberal educational policies perform two interrelated tasks; first, schools are organized to train students as the workers for service sector jobs and second, whole education system are designed to transform students into life-long consumers.

Lynch (2006) also indicated that "in line with classical economics view of education, neo-liberalism also defines the person to be educated in economic terms, as 'homo economicus', a labour market actor whose life and purposes are determined by their economic status" (p.3).

Lerman (2000), while describing the 'social turn' in mathematics education research indicated that mathematics education programs could be driven by four basic views of education;

> (1) an authoritarian view, the inculcation of an agreed selection of culturally valued knowledge and a set of moral values and

> ways of behaving; (2) a neoliberal view (Apple, 1998) producing citizens prepared for useful, wealth-producing lives in a democratic society; (3) a more old-liberal agenda of enabling children to become educated people able to fulfill their lives to the best of their abilities; or (4) a more radical agenda of preparing people to critique and change the society in which they engage. (Lerman, 2000, p.30)

The findings on curriculum implied that our curriculum which persistently highlighted *wealth-producing* citizens was considerably driven by a neoliberal view of education.

4.3 Profit-Driven Business Discourse on Textbooks

Two main points were determined in the educational program related to Profit Driven Business Discourse; first, supporting the usage of students' mathematics knowledge oriented to market needs as the name of Entrepreneurship, and second, emphasizing being a conscious customer. The first point included mainly guiding students to use their mathematical abilities for the better production and marketization of a commodity or service and second point included guiding students to use their statistic knowledge for decision making in consumption. By examining the problem context in mathematics textbooks and teacher guidebook, there is a chance to observe how these points connected to Profit Driven Business Discourse have reflection on mathematical problems.

The first illustrative example identified was the performance homework of 6^{th} grade first unit.

> *Unit 1. Performance Homework: Mathematician Administrator*
>
> *Dear students, assume that you are working as an administrator in a bus company. The number of passengers traveling in your company in four months were given to you in the below table*

1. Interpret which months there is a fall and which months there is a rise in passengers by drawing an appropriate chart.

2. You would like to take passengers' requests and suggestions so as to make them choose your company. What are the questions that you would ask?

3. To whom do you ask these questions?

4. In which months do you arrange additional trips? (TGB6, 2009, p.13)

To fulfill their homework, students were expected to draw and interpret charts and graphs, gather data, prepare a suitable questionnaire, and select appropriate sample. These are all important and valuable objectives for teaching statistic. However, apart from these objectives, students were directed to think as a manager and therefore, to use their mathematical abilities to increase the profit of their company.

Bowles and Gintis (1976) were one of the first researchers indicating that transmission of the proper norms and expectations of society to students who are the future workers of society is one of the main objectives of education. Parallel to this objective, Bowles and Gintis (1976) argued that education programs and materials were organized so as to help to raise new generations as the ideal workers and entrepreneurs in the capitalist society. They argued that the emphasis on work habits and beliefs favoring the development of modern capitalism was powerfully apparent throughout all sections of education.

In addition, while highlighting the objectives of neo-liberal education policies, Hursh (2005) indicated that neo-liberalism portrayed the 'students' as competitive and "instrumentally rational individuals who can compete in the marketplace" (p.5). He argued that since the economic productivity or effective production is an absolute must for neo-liberal economy, its education perspective becomes less interested in developing liberally educated people and more in developing people with the skills required to be

economically productive members of society. Hursh (2005) added that to be responsive to the needs of the international marketplace, education system was organized to raise citizens with appropriate skills and sense of entrepreneurship who are also capable of producing new and added economic values. The performance homework provided above can be considered as an example of this perspective where students were expected to develop appreciation for generating new economic values for their companies.

Bartlett, Frederick, Gulbrandsen, and Murillo (2002) briefly defined the usage of 'public schools for private ends' in the process of marketization of education. They claimed that highly intensive business climate in classrooms and around the schools represent marketization of the education. They indicated that neo-liberal perspective of education attempt to introduce the language, logic, and principles of private market into public education institutions. They argued that this neo-liberal discourse, which can be described as 'the public schools in the service of private economy,' becomes a hegemonic common sense.

Similar examples are listed below from 6th, 7th, and 8th grade teacher guidebook (TGB), students' textbooks (TB), and workbook (WB):

> *T-shirt Production Activity: Before the University Games begins, a T-shirt symbolizing the games will be produced by a company. For this reason, the T-shirt Company is working on a new T-shirt design. The designers of the company want to do a research on models and colors of T-shirts. What questions you would ask to participants if you were a designer? (TB6, 2009, p.46)*

> *A company will design a package for its new chocolate. To do this, it wants to prepare a questionnaire and to implement it to a particular community. If you were authorized, how would you choose the sample and which questions would you ask? (WB6, 2009, p.47)*

> *A company makes the promotion of its new product with different types of advertising. The type of advertisement and its percentage is given in the table. Create a suitable circle graph of the given data. (TB7, 2009, p.123)*
>
> *A company will give an advertisement to one of the two different radio channels. What questions should be asked to compare the two radio channels? (TB8, 2009, p.25)*
>
> *Prepare survey questions for researching what can be done to increase the profit of a newly opened pharmacy. (TB8, 2009, p.25)*
>
> *A company that sells kitchenware is doing a research about how it would increase the sales. A) Who should form the sample of this research? (TB8, 2009, p.38)*
>
> *A company that produces clocks did a research before presenting its new clock and formed the sample from only girls. A) Is this sampling method correct? (TB8, 2009, p.38)*

As can be seen, the context that students will use their mathematical skills was a company trying to advertise and sell its newer product, such as a t-shirt, a clock, or a chocolate. The pharmacy and kitchenware examples briefly demonstrated what is expected from students; a brain-storming for *what can be done to increase the sales and the profit.*

Hill's (2006) explanation of the projection of neo-liberalism for education was helpful for placing these textbooks' examples in the context of business discourse. Hill argued that neo-liberalism has a three-leg plan for education;

> 1) Business Plan for Education: This centre on socially producing labour-power (people´s capacity to labour) for capitalist enterprises, 2) Business Plan in Education: This centre on setting business ´free´ in education for profit-making, 3) Business Plan for Educational Businesses: this is a plan for

> British and US based Edu-businesses to profit from international privatizing activities (Hill, 2003, p.4)

According to Hill (2003; 2004), the first one of these plans, 'The Business Plan for Education', was related to reinforce two interrelated functions of schools; a) imposing proper skills and attitudes on students to provide labour-power for capitalist enterprises and b) providing discipline for children in order to ensure their ideological compliance for capitalism. According to Hill (2004), to reinforce these functions, the language of education was extensively replaced by the language of the market in all parts of education from classrooms to schools and from textbooks to education programs. Hill (2004) claimed that 'skill development' is quite overwhelming in education that the development of critical thinking is practically ignored.

Following example from 6th grade teacher guidebook is slightly different from above examples but it also reflects the profit-driven business discourse. Although this example is not related with advertising or marketization, it covers working hours of production process to make *employees more efficient* so as to increase profit:

> *Activity: Using Time Efficiently. It is expected from students to assume that they are the boss of a company and to arrange the working hours of their company in the way that employees will be more efficient. (TGB6, 2009, p.215)*

Lastly, an example from 8th grade teacher guidebook summarizes what neo-liberal understanding of education requires from students:

> *An activity related to Entrepreneurship: Each student realizes the possibility of converting his/her interest into economic function. (TGB8, 2009, p.45)*

The context of mathematics problems given above can be considered as the examples of how entrepreneurship which is defined in the educational program as *the abilities to*

establish a new system for a better production or marketization of a demanded product reflected in mathematics textbooks.

This expectation from students, *converting their interest into economic function,* reflected the neo-liberal turn in the education that Giroux (1999) highlighted. Giroux (1999) indicated that "the corporatizing of public education has taken a distinct turn approaching the 21st century" (p.140). With this turn, the organization of education was no longer to construct public good but to construct a private good intended to increase the investors' profits. According to Giroux, representing corporate culture in public education serves for a more radical agenda which aims to actualize principles of business in the organization of schooling. Giroux (1999) claimed that one of the pivotal attempts of this agenda was education of students in order to make them consumers and training of young people for the new global marketplace jobs.

Furthermore, profit-driven business discourse in mathematics textbooks was not limited to entrepreneurship. The problems focusing on companies' profit and loss status construct another space for profit-driven business discourse. Following problems are the examples of mathematic problems focusing on companies' profit and loss status.

> *Accommodation fee for all rooms in an eight-floor hotel is 55TL per night. If there are 25 rooms on each floor, what would be the earnings when the hotel is full? (TGB6, 2009, p.24)*

> *A café sells a kilogram of Water Pasty at 18TL. Calculate how much money does the café earn if it sells 9kg a day? (TGB6, 2009, p.26)*

> *Assume that you manage an ice cream shop. What type of graph will you use for showing the data on income and expense of your shop? (TGB6, 2009, p.51)*

> *Mr. Cem, who manages a school canteen, wants to make predictions for coming year by using the data on income and expenses of the past three years. (TGB6, 2009, p.54)*

The profit of The White Milk Company from the milk sale is given in the given chart. (WB6, 2009, p.131)

6-month profit and loss status of a company is given on the graph. How much TL is the company's 6-month average profit-loss situation? (TB7, 2009, p.19)

A company wants their shareholders to finance its 400TL loss. If the company has 8 shareholders, how much should each shareholders provide? (WB7, 2009, p.20)

Mr. Mustafa loses 70000 TL per month in the first 4 months of 2005 and he makes a profit of 40000 TL per month in the next 8 months. Find the monthly profit and loss status of Mr. Mustafa. (WB7, 2009, p.20)

The adjacent chart shows the status of two different pizza halls' 6-month profit situation. (WB7, 2009, p.127)

The following graphs show the monthly profit of a company that sells computers. (WB7, 2009, p.129)

Students were oriented to work on companies' profit and loss status while learning the basic operations in natural numbers or the interpretation of given charts. These examples can be considered as an imitation of corporate culture in the education settings.

The increase in the educational tasks which imitated the corporate culture was stressed as the evidence of marketization of education by some researchers. For example, Bartlett, Frederick, Gulbrandsen, and Murillo (2002) listed the observable effects of the marketization of education in a local setting. According to them, the rise in number of the private schools, expansion of the centralized curriculum and standardized testing, emergence of the business-organized education foundations and school-to-work programs, and over representation of the business interest and corporate culture in educational tasks were most apparent ones of these effects. They argued that the widest

and predominant influence of marketization did not come from any business project but from the dispersion of this business discourse through the educational tasks. They indicated that this business discourse subordinated the public goals of education, such as social justice and social equity, to economic goals of corporations.

Hill (2004) also indicated the role of books in the process of marketization of education. He indicated that textbooks are currently under great pressure of the finance capital, together with other capitals. He even argued that "the banks (finance capital, together with other capitals) control the books, and where the books don't work, or reach, then bullets and bombs are used. Books, banks and bullets combine in a permanent war to control our minds in support of the global project of imperialistic and militaristic neo-liberalism" (Hill, 2004, p.515). Hill claimed that education policy is a part of and a subordinate to the neoliberalism project and the textbooks filled up with corporate culture and business-related discourse is one of the main indicators of this subordination.

To summarize, the findings in the textbooks related to profit-driven business discourse were composed of two issues; the first issue was the continuum of entrepreneurship and included the mathematical problems on production and marketization for better profit, and the second issue included the problems related to companies' profit and loss status.

4.4 Profit-Driven Business Discourse on Classroom Practices

When the observations of 7^{th} grade classroom practices were examined, it was seen that the density of profit-driven business discourse was not as intense as curricular materials. Teacher-students relationship and dialog did not provide any indication of it. The only case that could be considered as an example of *conscious consumer* emphasis was a problem sentence in Percentage Calculation topic.

T: Ms. Melek learns that her favorite furniture set was on sale with special offer. This special offer is composed of different payment options. When paid in advance, the cost of furniture set was 3000 TL. According to this, find the price to be paid monthly in the following options. Which payment option would you choose?

(While writing to board) In the first option, there is a %20 discount when it is paid with cash. In the second one, there is a %10 discount if it is paid with 3 installments. In the third one, there are 12 installments and no discount if paid in advance.

This single example was not enough to reach holistic conclusions but it could be an indicator of how consumerism has spread from education program to mathematics classroom. Giroux (1999) claimed that public education became a mean for constructing commodity-hungry subjects by letting students only work on consuming some products. He highlighted the neoliberal trend through which the responsibility of education was no longer to create a democracy for 'citizens' but to produce a democracy for 'consumers'.

Another point arose in the classroom practices was to equate percentage calculations with interest calculations. The following three examples were from Interest Calculation topics. Students were expected to pretend as an investor:

What is the one year earnings of 75000 TL if the annual interest rate is %60?

What is 3 months earnings of 60000 TL if the annual interest rate is %70?

How long will it take to earn 21000 TL from 90000 TL if the interest rate is %70?

As indicated in the method section, students of this classroom were coming from lower-class families, mostly living in Gecekondus with limited resources. Being an investor

was far from these families. However, as also presented for the curriculum and textbooks sections, mathematics concepts were thought in a business-related discourse.

Similar to provided problems from mathematics classroom, Robertson (2005) tried to explain how the language of corporatism and managerialism surrounds the classroom discourse. After indicating that the classroom experiences were broadly confined with the language of corporatism and managerialism, Robertson claimed that "pedagogy in the public school setting has all too often followed the example of the corporate model to the expense of democratic principles, freedom and critical scholarship" (Robertson, 2005, p.12).

In addition, the limited findings from classroom observations were consistent with what Mitchell (2003) indicated about the expectations of neoliberal globalism from individuals. Mitchell claimed that students and children were oriented to either as consumers, workers, or entrepreneurs who would behave in continually transforming situations of global economy.

4.5 Profit-Driven Business Discourse on Teacher's Views

There was no pre-interview question directly related to profit driven business discourse. However, questions addressing teacher's general views about the relationship between social, cultural, and political values and mathematics education could construct a data source for my analysis. In the post interview, we had the chance to talk about my observations on profit driven business discourse.

I tried to provide examples from how neo-liberal understanding of education had reflected on elementary mathematics education. When I asked about the relationship between politics and mathematics education to the teacher; she stated that:

> *I do not think that mathematics has a political side; I can say that it is neutral. Eventually we are working with numbers. In*

> *textbooks … I did not look at it with such viewpoints but as I remember there were no political sentence or something like that. I do not remember any political expression in the textbook or guidebook.*

When talking on the changes in the new elementary mathematics curriculum, she added that:

> *Each government tries to change this curriculum. However the changes in mathematics curriculum were not connected to politics. The changes were mostly related to the order of topics and how these topics will be taught … use more concrete material, provide more times for activities and similar advices were given. Maybe there were political changes in social sciences but the changes in mathematics were mostly directed to teaching methods, or they add a new topic.*

The participating teacher indicated that mathematics was politically neutral and she did not realize any political side in the curricular materials. She claimed that the courses related to social science might be subject to politics but mathematics was not. However, teacher's expressions also provided the reason of her thoughts that she *did not look at it with such viewpoints* and she thought that while doing mathematics they *were working with numbers.* The emphasis on numbers and numerical calculations, not focusing on the problem discourse, and not considering the possibility of a relationship between mathematics education and political values could be considered as the reason of teacher's views of considering mathematics education as politically neutral.

The study of Porfilio and Yu (2006), was beneficial to understand and interpret the teacher's comments of 'neutrality'. Their study was an attempt to clarify how the rising trends of neoliberal globalization affect teacher education programs and the future teachers. Porfilio and Yu (2006) indicated that corporate culture, commercial values, and market principles are widely interfering and disturbing teacher education programs and unfortunately teacher educators and in-service teachers do not have concern about

this neoliberal trend and do not show any interest to its damaging effects. This lack of concern and interest could made teachers think that all educational processes are inherently 'neutral'. As an alternative, Porfilio and Yu (2006) claimed that "critical scholars, whose mission is to create democratic schools and a more just society, must broaden their collection of perspectives and methodology tools for the purpose of taking inventory of the constitutive forces that are fostering commercial logics, policies, and programs across the teacher education landscape" (Porfilio and Yu, 2006, p.10).

McLaren and Farahmandpur (2005) also indicated that some educators would not be able to connect political and ideological questions with the pedagogical questions. Similar to Porfolio and Yu (2006), they addressed teacher education programs as responsible for this unconsciousness. They claimed that teacher education programs failed to engage students in discussions about the interrelationship between education and neoliberal politics. According to them, teacher education programs were consciously detached from the class, culture, racial, and gender oppression. This detachment could be considered as the answer of why the teacher did not relate the mathematics education with neoliberal politics.

Bourdieu (1999) and Hill (2004) also emphasized that all sectors of education, from classroom to schools and from textbooks to curriculums, were generally considered as politically neutral. They argued that teachers, although they were in the center of education system, were also commonly having the position that places education not as a cultural, ideological, and economic reproduction agency but as independent from this reproduction.

As the reason of the view of neutrality, Bourdieu (1999) pointed out the achievement of the neoliberalism is due to the frequent emphasis on itself as the unique and with no alternative, which strengthens the dominancy of its discourse. Hill (2004), on the other hand, pointed out the teacher education programs as the reason of the view of neutrality. Hill claimed that teacher education programs were substituted by 'teacher training'

programs. He indicated that these 'training' programs were no longer interested with the school and society relation but were a place for non-theorized, skills-based lectures and training courses.

In the post-interview, I had a chance to ask the teacher what she thought about mathematics problems that I coded as examples of profit-driven business discourse. She stated that:

> *We are focusing on mathematics parts of these questions in the classroom, so, in fact, it does not matter so much. Students do not stress on the context so much. It would be better, of course, if the examples were from students' lives, but, eventually, you have no chance to relate each mathematics topic to students' lives. Yet, it will be better to use examples that students will be interested in more.*

Although teacher emphasized on using examples from students' lives, she indicated that mathematics inside the problem was more important than its context. Parallel to the pre-interview in which she indicated that *they were working with numbers*, she claimed that *they were focusing on mathematics parts.* The emphasis on the importance of *mathematics parts* in the problems was again presented as the proof of her politically neutral mathematics education views. In addition, she added the unfeasibility of relating each mathematics topic to students' lives as the justification of using profit-driven business discourse.

Another point that could be derived from teacher' comments was the divergence of mathematics education and critique. In line with her thought of 'neutrality' of mathematics education, the teacher did not construct a bond between mathematics problems and students' critical understanding of their lives. Although she mentioned about using *examples from students' lives,* teacher's concern was not to develop a critical perspective of students' own lives but to gain their interest.

Apple (2001) mentioned about this lack of critical perspective not only in teachers' views but also in every aspect of education. He indicated that the expanding and intensifying domination of the discourses and practices of neoliberal policies in every section of education imposed itself as the only alternative. According to him, this domination made it more difficult to transform common sense in more critical ways.

Goldstein, Macrine and Chesky (2011) also indicated that neoliberal policies attempted to dismiss any place for critique. They claimed that neoliberalism decorated each small piece of media and education with its own language, which is loaded with commercialism, privatization, and marketization. They argued that this neoliberal decoration defined its own 'reality' and tried to terminate any critical thoughts targeting this 'reality'. After termination of critique, the neoliberal 'reality' is considered and perceived as the 'common sense' and therefore politically, racially, ethnically, and culturally neutral.

The teacher's explanations did not provide a clue for what could be done to integrate a critical perspective to mathematics education, however, the works and arguments of some researchers (Gutstein, 2006; Lynch, 2006) would be a guide to achieve this integration. For example, adapting what Lynch (2006) argued for higher education to mathematics education would be very helpful. In line with Lynch's words, mathematics teachers needed to challenge the neo-liberal agenda in mathematics education, not because mathematics education was an increasing a need for the majority rather than a privilege for the few. Instead of surrendering the pressures to simply serve the market and to employ its values and methods without questioning into the *mathematics education*, *mathematics teachers* collectively and individually can powerfully challenge the new neo-liberal orthodoxies.

Giroux was another educator highlighting the role of teachers in the integration of 'critical voices' to education. A long statement about the role of teachers worths to quote here;

> In the face of increasing corporate takeovers, the ongoing commodification of the curriculum, and the turning of students into consumers, educators must mount a collective struggle to reassert the crucial importance of public education in offering students the skills they need for learning how to govern and take risks. Teachers must help students develop the knowledge necessary for deliberation, reasoned arguments, and social action (Giroux, 1999, p.147).

To sum up, I tried to present that profit driven business discourse as an indication of neo-liberal change in education gained a place in elementary mathematics education. I claimed that Entrepreneurship was the reflection of this discourse in Curriculum. I tried to take attention to the definition of Entrepreneurship which mainly emphasized developing students' abilities *to establish new system for a better production or marketization of a demanded product or service.* I argued that there was a tendency towards reducing the relationships in social life (such as being a citizen) to business relations (such as being a customer). I provided examples from textbooks in which students were directed to either (i) think as a manager to increase the profit of their company or (ii) focus on their companies' profit and loss status. I indicated that such examples were very limited for classroom practices in comparison to textbooks. I provided teacher's view about political neutrality of mathematics education and indicated two main reasons for seeing mathematics as politically blind; (i) emphasis on numbers, numerical calculations, that is mathematical parts, of the problems and (ii) not considering the possibility of the relationship between mathematics education and political values.

CHAPTER V

CLASS CULTURE

'Class culture', in the context of this study, was used to examine whether different cultural/social practices of different social/socio-economical classes were valued in a different way so as to provide a ground for inequalities in the mathematics education or not. 'Class culture' issue was examined with the help of the concept of 'cultural capital'.

The literature on cultural capital and its relationship to educational inequality was inspired largely by the work of Pierre Bourdieu. As described by Bourdieu (Bourdieu, 1977; Bourdieu and Passeron, 1977), cultural capital is the vehicle through which background inequalities in students' life are translated into differential academic rewards. The cultural capital theory argues that the culture transmitted and rewarded by the educational system reflects the culture of the dominant class. To acquire cultural capital, the student must have the capacity to receive and decode it. The acquisition of cultural capital depends on the cultural capital transmitted by the family. Consequently, the higher the social class of the family, the closer the culture it transmits is to the dominant culture and the greater the resultant academic rewards (Bourdieu, 1977; Bourdieu and Passeron, 1977).

'Cultural capital' concept's major insights on educational inequality is that students with more valuable social and cultural capital become more successful in school than do their peers with less valuable social and cultural capital. This perspective is very useful in attempts to gain a better understanding of how class influences the transmission of educational inequality (Lareau & Horvat, 1999).

There is already enormous and still growing literature on how the gap between students' own life and education discourse contributes the reproduction of existing inequalities in the social life. Specifically, the arguments of Bourdieu (1977), Bernstein (1977), and Lareau (1987) provided a comprehensive framework for the understating of this reproduction process. This section of this study would contribute to exemplification of this reproduction process in mathematics education so as to broaden the 'reproduction' framework.

Through this section, the curriculum, curricular materials and classroom practices were analyzed in terms of how they valued different class cultures. One of the main considerations of this section was to answer 'whose life' was presented in mathematics education discourse. At the end of the section, teacher's viewpoint on the class culture issue was presented.

5.1 Class Culture on Curriculum

When the Elementary Mathematics Curriculum was examined through the eyes of Class Culture, it was seen that there was no direct reference to class culture issue and/or different cultural practices of different social/socio-economical classes. However, there were some perspectives that could construct the infrastructure of our analysis of 'class culture'. Two related themes were emerged through the analysis; (i) the emphasis on the importance of the relationship between mathematics and students' real/daily life and (ii) the emphasis on solving real-life problems. The importance of using real life context in teaching and learning mathematics and focusing on solving real-life problems to reach the cognitive and affective objectives could not be denied. Both of these themes would be considered justifiably very important for teaching/learning mathematics. The aim was not to discuss or underestimate the importance/significance of using real/daily life context as a base of mathematics teaching. On the contrary, I tried to argue that there was a huge gap or contradiction between what Curriculum proposes and what curricular

materials, classroom practices, and teacher's views offered. This gap could provide a ground for inequalities.

Before going further, it was presented how (i) the emphasis on the importance of the relationship between mathematics and students' real/daily life and (ii) the emphasis on solving real-life problems were included in Educational Program.

(i) The emphasis on the importance of the relationship between mathematics and students' real/daily life

Introduction of the Educational Program started with the emphasis on the mathematics' growing usage in daily life:

> *The need for using and understanding mathematics is constantly increasing and gaining importance in daily life (EME Program, p. 7).*

The vision of Educational program was also described with the indication of using concrete experiences in mathematics teaching:

> *Mathematics-related concepts were covered through the basis of both concrete and finite-life models (EME Program, 2009, p. 7).*

The vision of the program stressed on development of students' affective abilities about integrating mathematics and real/concrete life contexts:

> *Learning mathematics includes thinking about mathematics, comprehending general problem-solving strategies and appreciating mathematics as an important tool in real life as well as the acquisition of basic concepts. (EME Program, 2009, p. 8)*

Moreover, the vision of the program claimed ‘using mathematics in their real lives’ as one of the main behaviors that the program expected from students at the end of their education:

> *To raise individuals who can use mathematics in their lives, solve problems, share their solutions and ideas, are capable of teamwork and self-confident in mathematics, and develop positive attitudes towards mathematics has a great importance in the education program. (EME Program, 2009, p. 8)*

In accordance with the vision of the program, the first general objective of teaching mathematics was defined with emphasis on using mathematics in daily life:

> *Students will be able to understand mathematical concepts and systems, construct relations among these concepts and systems and use them in daily life and other learning areas. (EME Program, 2009, p. 9)*

In conclusion, Elementary Mathematics Curriculum represented reasonable emphasis on the indispensability of mathematics in students’ daily life. Furthermore, the indispensability of students’ daily lives in teaching mathematics was underlined as much as the indispensability of mathematics in students’ daily lives. It was clearly indicated that mathematics should be taught based on *concrete and finite-life models.* Raising students with the ability of *using mathematics in their daily life* and *appreciating mathematics as an important tool in real life* was defined as the prior objectives of Curriculum. Parallel to the integration of daily life into mathematics teaching, ‘solving real-life problems’ came became the priority of the Curriculum.

(ii) The emphasis on solving real-life problems

The change in the approach of mathematics teaching took place from the introduction of the curriculum. There were indicators of the shift in the focus of mathematics teaching from basic memorization of arithmetic procedures to usage of these procedures in

solving real life problems. Students were not expected to practice the same basic operations several times but apply these operations in the context of real life situations:

> *While the importance of paper-pencil calculations in mathematics education is decreasing, the ability to make predictions and problem-solving have gained importance (EME Program, 2009, p. 7).*

In addition, one of the general objectives of teaching mathematics was defined with reference to developing problem solving skills and using these skills in daily life problems:

> *Students will be able to develop problem-solving strategies and use them in solving daily life problems (EME Program, 2009, p. 9).*

Moreover, 'problem solving skills' which was one of the most common skills defined in the program was described by referring mainly daily life problems:

> *Problem Solving Skills: Problem-solving skills are composed of skills that are necessary for solving students own daily life problems (EME Program, 2009, p. 12).*

Lastly, 'problem solving' was presented as one of the core mathematical skills in the program and the characteristics of a high quality problem were indicated with its connection to students' real life and necessities:

> *The problem should be related to students' real life, take students' interest and be noticed as necessary (EME Program, 2009, p. 12).*

It can be concluded that 'problem solving' was placed at the heart of elementary mathematics teaching. Furthermore, students' daily life/real life examples/concrete life models had a growing place in the context of the mathematical problems. As could be

inferred from the definition of '*problem solving skills'*, there was a tendency to merge mathematical problems with real life problems.

In terms of our analysis of class culture, as indicated in the beginning of this sub-section, there was no direct reference to culture of specific or dominant or different social classes or different cultural groups. However, the growing emphasis on students' real life, when the class culture issue was considered, implies favorable signs. It can be expected that this perspective of curriculum will be reflected in the classroom practice so as to provide adequate examples for students coming from different social classes. Specifically, working class students and students from minority cultural groups could have chance to work on mathematical problems in the context of their specific problems. Working class students could be confronted with examples driven from their own lives instead of virtual middle class life/context. By considering its stress on 'real life', it could be argued that the curriculum carried the potential of being culturally and socially sensitive.

On the other hand, it should be pointed out that the lack of definitions and descriptions about daily life/real life of different social classes could be one of the main obstacles of turning that potential into a reality. Specifically, the lack of emphasize in the curriculum about social classes which had a limited and restricted voice in both social life and educational organizations caused their silence to continue in mathematics classrooms. The curriculum did not show any sign of the fact that different social classes had different daily life practices and different real life problems.

Casey (2005) and DiMaria (2006) also stressed on this risk of being silenced in the context of education. They claimed that despite all promising talks and expressions about the diversity (and all aspects of students' real life), these expressions could be a screen for hiding complex realities, especially for students coming from working-class families. They indicated that the contemporary discourse on diversity (student' real life) is not convincing about that the working-class students will be equally assisted by the

content and context of education. They claimed that current diversity (real life) rhetoric continues to conceal the cultural difference of social classes and so promote the 'middle-class ideology' of education as the dominant and legitimate one. Casey (2005) and DiMaria (2006) argued that the real life examples and cultural values which students from middle- and upper-class families take for granted could be normally foreign to working-class students whose real lives are far more different than the others.

By citing Casey's (2005) words about diversity, it can be said that "we frequently fail to parse the *real lifes* within *Real Life* concept!" (Casey, 2005, p.1). Casey indicated that the lives of working-class students were not significantly considered in the discussions of education discourses. She provided some examples from their courses to indicate that students from less privileged backgrounds had difficulties to deal with courses which were based on values and characteristics of more privileged backgrounds. She indicated that an education system which did not specifically aim to address this unfamiliarity of the working-class students would become the responsible for continued silence of working-class students. Similar to Casey's arguments, 'real life' concept in the elementary mathematics curriculum failed to recognize socially, culturally, and economically disadvantaged groups and cannot serve proper educational plans for their more equal participation in educational settings. To overcome this deficiency, curriculum should present 'class background' as a potential category of difference and provided a new way of thinking about the 'real life' concept.

As presented above, although elementary mathematics curriculum emphasized on solving 'real life problems', it did not pay attention to differences in the 'real life problems' of different social classes. Giroux (1985) argued that education programs, which did not address the questions about how and why the education contexts were chosen and whose interests would be served, failed to embrace the cultural diversity of social classes. He indicated that students in such education contexts "were constituted as a unitary body removed from the ideological and material differences that construct

their subjectivities, interest, and concern … a predetermined and hierarchically arranged body of knowledge is taken as the cultural currency to be dispensed to all children regardless of their differences and interests" (Giroux, 1985, p.25).

Cavieres's (2011) investigation of the education reform in Chile provided supportive expressions about my indication of the risk of overlooking of working class culture in the education program. Cavieres analyzed the Chilean education reform movement in terms of its call for "the respect toward the cultural differences among social groups in schools", "the inclusion of students' personal experiences within their learning" and "the integration of a notion of cultural pluralism within educational policies" (Cavieres, 2011, p.112). His analysis indicated that the education reform had a tendency to overlook the culture of low-income working class students and had the danger of marginalizing these students in the educational system. Cavieres pointed out the 'neoliberal model' that guided the reform movement as the reason of these tendencies. He claimed that the neoliberal alterations implemented since the 90s in the economic, cultural, and educational areas brought social, economic and cultural exclusion for lower social classes. Since our case and Chilean case showed notable similarities, it worth to quote Cavieres's conclusions on education reform;

> "Although the reformers recognize the importance of student's cultural backgrounds, at the same time they emphasize educational practices based on competition, individualism, and accountability that divide students based on academic and class lines, as well as exclude those cultural experiences of students from urban low-income neighborhoods not considered appropriate to the goals pursued by the reform. As a result, these students have been marginalized from the educational processes promoted in their schools" (Cavieres, 2011**,** p.112).

After indicating the failure of education reform to increase the educational opportunities for low income working class students, Cavieres (2011) proposed a socially and culturally sensitive curriculum which aimed to incorporate approaches that are focused

on helping working class students to overcome their unfamiliarity with education contexts by considering their social and cultural backgrounds. He indicated that creating educational spaces in which the interests and needs of working class students were closely taken into account was the key of such culturally sensitive curriculum.

The works of Bernstein (1977), Bourdiue (1977), Apple (2002), and Sullivan (2001) also highlighted the needs of considering social, economic and cultural differences in designing education program. For example, Apple (2002) indicated that if the gap between the students' real lives and educational contexts was not shortened, then "school reforms, even those that seemed most liberating, ultimately not only did not change society, but did actually reproduce the social divisions in that society in even more hidden ways" (Apple, 2002, p.608). Apple's statements were also consistent with Bourdieu's (1977) claims which indicated that students from lower social classes would suffer most from an education program which is designed to include content and styles that are associated with only the dominant culture. Bourdieu argued that educational programs could not demand having the same cultural backgrounds from every student. He indicated that especially linguistic and cultural competence of students were mainly determined by their families and showed significant difference in families from different social classes. He claimed that educational settings should take into consideration these differences to address social inequalities.

In the following sub-section, daily life/real life problems in the textbooks were analyzed in terms of whether these problems reflected cultural practices of all social classes and cultural groups or not.

5.2 Class Culture on Textbooks

In this section, problems in the textbooks including any sign of real/daily life context were listed. The contexts of these problems were analyzed for whether they were reflecting a cultural practice of specific social classes or not. The preliminary analysis

led me divide the daily life problems into three sections; (1) the problems based on life/activity of whole family, (2) the problems based on off-class activity of children/students, and (3) the problems based on life/activity of an adult character. Based on the findings describing a family's or child's life, I tried to draw a profile of 'daily/real life' in the problems. This constructed daily life profile was examined for whether it reflected a 'daily life' of specific social classes or not.

Following sentences were the problem cases in which the discourse of the problem was the daily/real life of a whole family;

> *Ömer who lives in Ankara plans to visit his grandfather in Erzincan with his family during national holiday. (TB6, 2009, p24)*
>
> *Mert, his wife, and their two children participate different activities such as theater, cinema, and exhibitions every weekend. This weekend, they will go to the theater to see "Ferhat and Şirin" . (TB6, 2009, p.30)*
>
> *Cansu takes a lot of photos in her visit to Çanakkale Cemetery on summer holiday with her family. (TB6, 2009, p.31)*
>
> *Kaya family travels from Çanakkale through İzmir-Aydin-Muğla and Antalya on ship in their holiday. (WB6, 2009, p.41)*
>
> *Alper's family went from Çankırı to Gaziantep to spend their holidays. (WB6, p.52)*
>
> *Gezer family visited 6 provinces with their car during the summer vacation. (TB6, 2009, p.54)*
>
> *Elif went to the cinema with her family at the weekend. (TB6, 2009, p. 201)*
>
> *Mert goes to the theater with his mother and father. (TB6, 2009, p.222)*

Esen family redecorates their house that they recently bought. (TB6, 2009, p.248)

Gamze's family is building a detached house. (TB6, 2009, p.248)

Bayraktar family wants to build an 8m^3 storehouse in their farm. (WB6, 2009, p.249)

Mother, father, and three children visit the museum. (TB7, 2009, p.70)

Zeynep's family buys Turkish delight as a gift from Afyonkarahisar while returning from their vacation. (WB7, 2009, p.77)

The mathematics problems provided above, although not affluent enough, were the adequate indicators to draw a profile of a 'family'. 'The family' in the problems was the one who *participates different activities such as theater, cinema, and exhibitions at every weekend, visits grandfather, grandmother, or eldest of the family in national holidays, travels different resorts/seaside during the summer vacation,* and *builds/bought a new house or redecorates the existing one.* This family in the textbooks reflected an excellent sample of typical upper-middle class family in Turkey.

First of all, going to a theater or an exhibition could be an ordinary activity or represent a routine for middle and upper-middle social classes in Turkey, however for the lower classes or working class, it was a case only actualized in books. Similarly, travelling through seaside in the summer vacation or going to a winter vacation could be a 'sine qua non'/necessity for middle and upper-middle classes. They might be planning for these vacations through the whole year and they might take necessary arrangements while working. On the other hand, these vacations were far from the life of lower class families. Moreover, buying a new house or redecorating the existing one could be one of the main considerations of middle and upper-middle classes. They had the requisite

financial conditions. The possibility of decorating their new houses was considerably high and they could devote their time to plan those decorations. Conversely, most of the lower class families live in rental houses and they devote most of their efforts for paying the rent.

The meanings of these findings would be more meaningful when the literature about the impact of families' social, cultural, and economical background on children's educational experiences was considered. The effect of social and cultural background of students on their educational achievement was well-described in the field of sociology of education. Although the studies about this issue focused mainly on educational outcomes, as Lareau (1987) indicated, there were very limited sources about the processes through which these educational outcomes were created and reproduced. The findings provided above can contribute to these researches by showing the gap between the context of textbooks and the realities of students.

As described above, the context of the textbooks' examples relied on the lives of middle and upper-middle families. These findings were consistent with what Bourdiue (1977), Bourdieu and Passeron (1977) and Lareau (1987) argued about the characteristics of knowledge and values presented in the educational settings and texts. For example Lareau (1987) stated that schools "draw unevenly on the social and cultural resources of members of the society and utilize particular linguistic structures, authority patterns, and types of curricula; children from higher social locations enter schools already familiar with these social arrangements" (Lareau, 1987, p.74).

The dominance of middle-class values in educational discourses was emphasized considerably in the literature of critical studies of the relationship between social classes and education (Foley, 2010). Foley (2010) stated that middle-class family background emerged as one of the best predictor of academic achievement in these studies. He argued that 'business models of education' and 'class-biased curriculum and pedagogical practices' were two of the basic reasons of middle-class domination in

education. While such domination of middle upper-middle classes' values favored the students from higher social classes, it punished the students from lower social classes. As Foley indicated these factors tended to reproduce, rather than reduce class inequality.

In addition, the financial resources of middle and upper middle class families had also great impact on their students' academic achievement, however, as Craaf, Craaf, and Kraaykamp (2000) indicated financial resources were not the only aspects of family resources that provide an explanation of the relationship between families' social background and children's educational outcomes. They indicated that while middle and upper class families provide their children access to more privileged, better schools and extracurricular activities with the help of their economic resources, they can provide values and dispositions which are familiar and compatible with schools' expectations with the help of their cultural resources.

The following sentences were the problem cases in which the discourse of the problem was the daily/real life of a student or a child:

> *Thirty students in 6-A class will organize a trip to Göreme which is one of tourist destinations in our country at the weekend. (TB6, 2009, p.29)*
>
> *The following paragraph describes how 6th grade students provided aid to a poor school. (TB6, 2009, p.30)*
>
> *Melek marked the days in which she will go to English class on the November 2005 calendar. (TB6, 2009, p.35)*
>
> *Pınar is following French classes half of the month. (TB6, 2009, p.35)*
>
> *Ahmet and Emre, who attend to different schools, are following the same bağlama (traditional Turkish music instrument) class. (WB6, 2009, p.41)*

Sinem marked the days of her Violin class with pink and the days of volleyball training with blue on the calendar. (TB6, 2009, p.43)

While teaching Graphics, to gain students' attention, students are expected to bring the graphics they see in newspapers and magazines to the class. (TGB6, 2009, p.50)

A bookcase was built in Ayşe's room. (TB6, 2009, p.110)

Burak's computer password is a four-digit number and it is divisible by 3. (TB6, 2009, p.115)

Aysegul went shopping to buy plastic plates, cups, and napkins for her birthday party. (TB6, 2009, p.123)

Sengul will buy fruit juice, chocolate, and candies for her birthday party. (TB6, 2009, p.124)

Zehra gave 4/7 of her books in her library to Salih. (TGB6, 2009, p.144)

Cem and his friends went swimming class through a whole year. (TB6, 2009, p.181)

Duru and her friends rent a phaeton to take a trip in Büyük Ada. (WB6, 2009, p.186)

The class size of Alpaslan's classroom is 20. (TB8, 2009, p.70)

Similar to the profile of a family, it was possible to draw a profile of a life of 'a child/student'. 'The child' in the mathematical problems was the one, who would *take different classes through the year,* such as *a language class, a musical instrument class, or a sport class, participate different out-door activities with his/her friends such as going to swimming or taking a trip, go to shopping for his/her birthday party, have a computer and a bookcase,* and *s/he would organize with his/her small size classroom either a trip to touristic destination or a campaign to help for a poor school.*

This picture of students' lives was also a brief drawing of middle and upper-middle classes' children lives. These findings were consistent with the findings of studies which investigated working class and middle class students' education progress. Stuber (2009), for instance, claimed that students coming from upper-middle class families entered college with cultural resources that encouraged their participation in classroom activities. She indicated, on the other hand, that students coming from working class families generally had the cultural resources that prevent their involvement in these activities. After observing the students coming from different social classes, she concluded that those who already possessed valued cultural and social resources had better chance to comply with educational texts and classroom activities.

The works of Bourdiue (1977, 1984), also, can contribute to make sense of these findings. Bourdiue's theory of cultural capital proposed that if the discourse of the school, classroom or educational texts was basically composed of middle-class culture then it might be expected that working class students would find themselves in a culturally unfamiliar setting and unable to benefit to the same extent as middle-class students. With his analysis of the relationship between social classes and education, Bourdiue highlighted that the education system was substantially controlled by socially and culturally dominant classes and so the knowledge and behaviors valued in the educational texts and rewarded in the classroom settings were the ones these classes naturally had. He argued that while the culture of working class was disregarded in education, the congruence of school culture and upper-middle class culture increased the "readiness" of upper-middle class children for school knowledge. He added that in an educational system dominated by middle and upper-middle classes, the culture of the dominant classes becomes "culture" itself and the culture of lower classes was excluded from the every aspect of these educational system. The findings presented above were a suitable example of the process of how the culture of the dominant classes became the "culture" itself.

Following sentences were the problem cases in which the discourse of the problem was the daily/real life of an adult:

> *Ali Bey cares for his health. He decided to buy a summer house to escape from stressful pace of everyday life. (TB6, 2009, p.224)*
>
> *Regular sport is very important to have healthy living. Being aware of this, 260 people have become a member of a sports club in one year. (TB7, 2009, p.46)*
>
> *Mr. Hasan wants to rent a car before for his summer vacation. (TGB8, 2009, p.25)*
>
> *Mr. Engin decides to buy a laptop. To decide which laptop to buy, he compares the following computers. Which questions can be asked for this comparison? (TB8, 2009, p.29)*
>
> *Mr. Okan wanted to get a camera and investigated the prices of different brands and models of cameras. (TB8, 2009, p.66)*
>
> *Mr. Okan exercises every morning. (TB8, 2009, p.205)*

The problems which were based on the life/activity of an adult and included cultural/social indicators were not very extensive. However the limited number of examples provided an idea and supported drawn profile of 'family' and 'child' life. 'The adult' in the mathematical problems was the one, who would *care for his health* either by *buying a summer house to escape from stressful pace of everyday life or becoming a member of a sports club* and *investigate the prices of different technological devices*.

When the findings about the 'real life' problems in the textbooks were considered together, the analysis of the problems based on (1) life/activity of whole family, (2) off-class activity of children/students, and (3) life/activity of an adult character provided a profile of middle and upper-middle class family life.

As stated above, these findings provided support for the Bourdiue's (1977, 1984) arguments that the culture of dominant social groups was the only culture valued in the educational texts and institutions. Elementary mathematics textbooks took the cultural practices of the dominant groups as the only natural and valuable sort of culture, and also treated all students as if they had equal access to these cultural practices. This brought that students from middle and upper middle classes communicated more conveniently with these educational texts by the help of their cultural capital and their familiarity of this education language/context (Sullivan, 2001). On the other hand, as Casey (2005) highlighted, working-class students without such familiarity communicated these texts in an uncomfortable ways. Casey indicated that these students encountering cultural practices in which the culture of their families had already been excluded can feel as their identities undervalued and find themselves psychologically and culturally worthless. Working-class students who were not fully comfortable with these cultural texts and settings would benefit less than their upper-class counterparts from education system.

The work of Yamamoto and Brinton (2010) can be cited as an example of how these cultural background differences turned into educational outcomes. Yamamoto and Brinton (2010), investigated the effect of cultural capital on educational performance and attainment in Japanese Education system which was similar to our education in terms of "(1) a strong reliance on student assessment through standardized examinations and (2) widespread parental investment in academic tutoring and private exam preparation courses for their children" (Yamamoto and Brinton, 2010, p.67). Their analysis of cultural capital effect showed that the congruence between students' cultural practices and educational discourses (for example, music and arts participation with parents) was a significant predictor of educational performance and attainment.

Furthermore, Pearce, Down, and Moore (2008) investigated how middle-class values conquered the higher education and how working class students were treated in this

middle-class culture domination. They pointed out that the culture, values, and knowledge of the white-middle class have been rewarded over all other cultures, their culture and values became normalized and perceived as 'natural', and therefore the higher education system was socially and culturally biased. By inheriting Bourdieu's cultural capital theory, they indicated that the personal experiences/histories of working-class students did not correspond with the current discourse of higher education institutions (such as universities) and so they were more likely to feel and to be excluded. They argued that education institutions should give greater attention to understand and overcome the alienation and exclusion of the working class students.

The replacement of 'real life' with the middle-class social life in the textbooks could be considered as the consequences of the asserted deficiencies in the curriculum. When all the expressions about 'real life' in the curriculum and the replacement of 'real life' with the middle-class social life in the textbooks were considered, it seemed that it hid complicated realities, especially for the working-class students.

5.3 Class Culture on Classroom Practices

The observations of classroom practices provided limited but explanatory examples for how class culture issue was reflected in the classroom discourse. The examples were mostly observed in the 'interest calculations' and 'percentage calculations' topics. Some of the quotations from classroom dialogs were presented lengthy so as to investigate how the class culture discourse was realized in the classroom setting.

The first examples presented here were the questions solved in the 'interest calculations'.

> *T: What is the one year return/interest of 75 000 TL with annual interest rate of 60%?*
>
> *Nergiz: Teacher, do we calculate the %60 of it?*

T: Yes, you can. Ok, the money was deposited for one year interest. If we find %60 of it, then we find the interest already. What will we do if it was 2 year interest?

Nergiz: We divide it into two?

T: We will multiply it.

T: Ok, who will find it? Now, we have a formula (the interest formula was written in the corner of the table: Interest = A.n.t /100). The interest was asked. In this formula, you should write the money in place of 'A', the time in place of 'n', and the interest rate in place of 't'. ok, let's replace them. What is the money, 75 000, what is the time, one year, what is the interest rate, 60. Ok, 75000 times 1 times 60 over 100. That is it.

Stdts: Teacher, what is the result?

T: I don't know the answer. Ok, Nil, come.

*Nil (wrote on the board): 75000*1*60/100=7500*6=45000*

T: Ok, then, what was the interest of 75 000 TL with the rate of 60%, it was 45000. What will be the total money that we get from the bank?

Nil: 45000, isn't it?

T: It is the interest. We have also 75000 in the bank, its' interest is 45000, so we will get 120000.

The following examples were the other examples solved in the same lesson:

What is 3 months earnings of 60000 TL if the annual interest rate is %70?

How long will it take to earn 21000 TL from 90000 TL if the interest rate is %70?

Another example presented here was about the automobile insurance problem that students worked on in the 'percentage' topic.

> *T: Ok, let's read the question and finish the activity. Mine, read it.*
>
> *Mine: Mr. Remzi's automobile insurance costs 666 TL. Since he did not pay it in time, he will pay it raised by 6% and in 8 installments. Calculate how much money would he have to pay for each installment.*
>
> *T: Ok kids, the insurance fee is already clear, it said that it will be raised by 6%, maybe he was late to pay it, how much money will he pay with this raised percentage? Normally he has to pay 666 TL, the raised price was asked. Ok, what will be the way we should follow? How we do that? Fırat?*
>
> *Fırat: Teacher, he will pay 6% more, I found the 6% of 666. Then, I added the result to 666, it was nearly 705.*
>
> *T: Yes, right, what is the first thing to do? To find the 6 percentage of 666 which was the money he should normally pay. After finding its 6%, we will add it to 666. Let's find it. What can we do to find the percentage of a number? We will multiply the number with the percentage. Ok let's multiply, everybody will do it, I want the 6% of 666.*
>
> *Zehra: Teacher, is the result 39,96?*
>
> *T: Yes, let's add it to 666. How did we find the 6%? We multiplied 666 with 6/100, what was the result, 39,96. Now, let's sum it with 666. The result will be 705,96.*
>
> *Fırat: When we divide it to 8, the result is 88,2*
>
> *T: Hım, we will pay it with 8 installments, let's divide the result to 8. Now, when you divide it to 8, you can clear the comma. Let's multiply 705,96 with 100, then we should also multiply 8*

with 100, what is the result, 70596/800, now we can run the division.

(while running the division on the board)

T: There is no 800 in 7, or in 70, or in 705, how many 800 is in 7059? Eight.

T: 8 times 800, 6400, after subtracting it, we have 659. Then 6 comes above, how many 800 is in 6596? Again eight.

T: When we subtract 6400, we have 196. Ok, actually, the division is over, however if you want to continue to find decimal digits, you can write a '0' to end of the 196.

T: Is there anybody who continued the division? What is the result?

Stdnts: 88,24

T: Ok, these two decimal digits are enough.

Another example was from the percentage calculations;

T: Yes, write the question, when going on holiday, Mr. Ali forgot to pay his 50 TL-electricity bill. He, with its penalty having interest rate of 4.5% per month, pays 50,75 TL. Accordingly, how many days did he delay the bill?

There was also a teacher's explanation during interest calculation topic;

T: Ok, we, lastly, worked on profit and loss calculations. In this lesson we will work on interest calculations. Maybe you have heard about interest calculations, when you take a credit from a bank to meet your needs, you pay it back with some interest. Or, when you save up some money, you may want to make an investment. When you invest it to the bank, it can be monthly or yearly, they pay you back with its interest. When you want to

loan a credit, for buying home or car, the bank gives you money, then you give them back with its interest.

As it can be seen from the quotations provided above, the examples solved in the classroom showed similarities with the textbooks' examples in terms of the class culture they presented. The families who *saved up money to make investment*, who *loaned a credit from a bank to meet your needs*, who *went for a holiday* or who *paid their automobile insurance* were not similar to the families of 7-A students.

The longer quotations provided beneficial information/clues about how these discourses were realized and perceived in the classroom setting. These problem solving procedures were centered on the basic calculations that the cultural context of the problems were near to evaporate. As could be seen from the dialogs, neither the teacher nor students has referred to the context of problem situations while solving the problems. Students' and teacher's follow-up questions in the problem solving process were related only to calculations. The reason for students' and teacher' disconnection from the context in the problems solving would be the disconnection of these problems' contexts from the students' real lives.

Foley (2010), while investigating the rise of class culture theory in education, indicated that anthropological studies provided strong evidences for how the linguistic and cultural mismatch between home and school were quite influential in students' participation of classroom and school activities. Although my findings did not provide information about the measure of students' participation, it can be argued based upon our analysis of classroom communications that the quality of these participations was not high enough.

Stuber's (2009) comparison of working class students' and upper-middle-class students' participation in the higher education setting also supported my indication of class culture difference. She concluded after her comparisons that "upper-middle-class

students arrive on campus with cultural resources that motivate their participation and social resources that facilitate their involvement" (Stuber. 2009, p877). She added that the social and cultural resources that working-class students brought the classroom caused not only curtail their interest in such activities but also decrease their educational gain from these activities.

The works of Lareau (1987) could again contribute our discussion about relationship between students' classroom activities and their cultural background. Lareau claimed with referring the related ethnographic researches that classroom learning was responsive to the students' experiences of their real lives. She indicated that researches focused on the social organization of the classroom and the relationships between teachers and students showed that cultural background of the students affect both the quantity and quality of the students' participation in classroom activities. Lareua suggested that that social class position and class culture should be take into consideration in all aspects of school setting and briefly summarized the situation as "members of the working class have cultural capital as well, but it is only rarely recognized by dominant social institutions" (Lareau, 1987, p.83).

The effects of the disconnection between working-class children and educational settings were examined in the case of Northern Ireland (Ingram, 2009). Ingram (2009) studied school life of students coming from the disadvantaged working-class community and searched for the reasons for the negative statistical correlation between being working class and educational achievement. Ingram claimed that the cultural identity of working classes was perceived as invalid within the educational field and the cultural disjuncture between students' real life and classroom life contributed to alienation of working class students. She added that school culture and working-class culture were not generally coherent and most of the time while the pedagogic actions validated middle class language and behaviors, it simultaneously devaluate the working-class culture.

The next sub-section covered the teacher's view about how social and cultural differences of students were addressed in mathematics education in general, in her classroom in specific. I tried also to provide teacher's view about 'real life' examples in the textbooks and in the classroom to deepen the discussion I presented above.

5.4 Class Culture on Teacher's Views

In the pre-interview, we talked about the relationship between social and cultural differences and mathematics education. As quoted in the 'Profit-Driven Business Discourse' section, the teacher indicated that mathematics education was politically neutral. Her views about socio-cultural issues were parallel to this neutrality. She claimed that:

> *Cultural issues … I think they are similar with political issues. I mean, I do not think that mathematics could be related with cultural issues.*

The teacher indicated that mathematics education and cultural issues had no common points. It was also understood that she had not thought enough about possible relationships about these two concepts. In addition, the teacher indicated that the question was not clear for her, so I tried to clarify my question with the following sub-question "Do you think that certain cultural values in the society are more valued/appreciated/prized than others, or more frequently used or dominant in mathematics education? For example, the cultural values of those with better socio-economic status?" She stated that:

> *I have never thought that there is difference in appreciation of cultural values. I don't think that cultural values of those coming from different socio-economic backgrounds are valued differently in schools. You may intend to point the culture of rich/wealthy students but their cultures are not so different from the others. In the end, they are children, they play together, and*

> *they are not so different. Of course, there are some differences, for example their clothes or their belongings, pencils or notebooks, however these differences are not reflected in their cultures a lot. Besides, we try to eliminate these existing differences in class. We try to make students not feel repressed or not be influenced by these differences.*

Teacher claimed that it was not possible to mention about any *difference in appreciation of cultural values.* She indicated that different cultural values respected similarly in schools. She also stated that the cultural differences in families did not affect students extensively. The only difference she mentioned was related to the economic potentials. She insisted that these differences did not influence her behaviors towards students.

Although the teacher indicated that cultural values of different socio-economic backgrounds were not valued differently in schools and the only difference was related to economic conditions, the related literature emphasized the deficiency of this view. Bourdiue (1977) and Lareau (1987), especially, provided comprehensive examples about the favorable cultural capital that upper-middle class students brought the education process. Since the teacher in our case and teachers in general tend to focus on only the difference in material resources, this affluent cultural capital literature should make teachers more careful about the possible inequalities that the difference in cultural resources would bring to classroom. Only this awareness can lead teachers to take precautions about possible inequalities.

What I tried to explain here would became more concrete by quoting Forsey's arguments about the role of teachers in the re-production of 'middle-class culture' in and through schooling; "many teachers find themselves, wittingly and unwittingly, willingly and unwillingly, involved in re-producing forms and styles of schooling that suit some students very well, or well enough, and do not suit other groups of students very well, or well enough" (Forsey, 2010, p.69). Especially, when the background of teachers were also shaped by the middle class values, teachers had more positive

attitudes towards the middle class students who share the similar cultures and customs with them (Bratlinger, 2003; Forsey, 2010).

In addition, besides teacher's comments on that her behaviors did not show any difference with respect to students' socio-cultural background, researchers indicated that students with more cultural capital communicated more easily with their teachers and were more likely to meet the teachers' expectations. Students from the working class, on the other hand, were more likely to experience classroom culture climate as hostile and had difficulties to communicate with their teachers (Craaf, Craaf, and Kraaykamp, 2000; Lareau and Weininger, 2003). Therefore, it would be not enough for teachers to behave identical to each student but they should show intensive efforts to comprehend their students' socio-cultural differences and to provide classroom discourse in which these differences were addressed so as to not cause any injustice and inequality.

When talking specifically for the curricular materials (textbooks and guide book) the teacher repeated her views:

> *In textbooks … I did not evaluate textbooks with the light of cultural issues but I don't remember any sign of cultural problems or anything like that. Neither political issues nor cultural issues, I did not observe any of them.*

Similar to political issues, the teacher thought that textbooks were value-free in terms of cultural values. On the other hand, when it was asked how her values affected her teaching and her classroom practices, she, somewhat, moved away from the value-free understanding of mathematics teaching:

> *My values? Their effect to my mathematics teaching or my examples in the classroom was not very strong, but sometimes, I give a break in the lesson, I try to guide my students about their*

> *lives. To guide them positively, I try to be a good model for them. I try to give advices. I hope I have an effect.*

When I asked her to exemplify her advices, she continued:

> *I try to give advice to make them more successful both in mathematics and life. Most of the students are coming from very poor families; they have no alternative other than being successful in the school, they will either be worker like their fathers or be successful in the examinations. I try to show them this. My values have only such effects, if any.*

Although the teacher did not give specific examples about how her political/cultural values affected her mathematics teaching, it could be inferred that she somehow tried to transfer her values to students. She saw herself as a fine model for her students. Her advices were basically related to being successful in schools. She indicated that the only possibility of having a good life could be emerged from being successful in schools. Such understanding was not separated from teacher's own values.

In the post interview, to clarify teacher's views about the relationship between mathematics education and class culture, I asked her about her views about students' reactions/attitudes when she gave examples or asked questions from students' own lives. She indicated that:

> *Such examples or questions can raise more interest, of course. For example, while teaching the concept of KDV [tax for goods] calculations in the percentages topic, I wanted students to bring receipts from their homes. We made calculations by using these receipts. Such activities gained students' interest/attention more than standard questions. But it was not very effective for all students; generally the interested students were again the successful ones. The ones who brought the receipt, the ones who made calculations correctly, were all the same students; the others did not show any interest or effort.*

The teacher indicated that giving examples from students' own lives could be an effective tool to gain their interests and make them participate more willingly in classroom activities. She supported her view with an example from the percentages topic. However, while giving details about the example, she limited this gain with only successful students who were already interested in the classroom activities. This could be an indication of her views that the effects of these examples would generally be overestimated and generally be applicable to rather successful students. This view might be the reason of limited usage of such examples in the classroom as it was given above.

The following post-interview question was intended to clarify teacher's views about the characteristics of the questions that were related to students' lives. I asked her the kinds of concepts or expressions she would use if she wanted to ask questions more close to students' lives and she answered as:

> *I try to ask related questions already. I, generally, want them to give examples from their lives. I try to clarify the concept by using their examples.*

When it was asked to exemplify such situations, she continued as:

> *There is no specific example I remember. I think there is not much specific topic/content which is common for all students, that if I give examples from football, girls will not be interested in it. If the examples will be related to cooking, then boys will not be interested. That is, it is difficult to find a common concept.*

The teacher thought that letting students give some examples from their lives was sufficient to close the gap between students' lives and mathematics. These examples were, of course, necessary, but did not seem to be sufficient. Moreover, her examples about common concepts, football and cooking, were not specific to her students' lives, they were too general to let students focus on their own lives for a mathematical example. She also indicated the difficulties of finding a common concept for her

students. This consideration could be another reason for limited usage of such examples.

While indicating the importance of ‘giving examples from students’ own lives’ and her attempts to integrate such examples in her teaching, the teacher also mentioned about the difficulty of finding such examples. In addition, as I emphasized above?, teacher’s daily life examples both in her comments and in her classroom practices were not consistent with her students’ ‘real life’. What DiMaggio argued about the teacher-student communication could be one of the reasons of this inconsistency: “Teachers communicate more easily with students who participate in elite status cultures, give them more attention and special assistance, and perceive them as more intelligent or gifted than students who lack cultural capital” (DiMaggio, 1982, p.190). Therefore, at an unconscious level, the teacher might not consider finding examples from her students’ lives as important, which made it difficult for her to provide examples during the interview.

Forsey (2010) also addressed the same point as the reason for low quality communication and interaction between teachers and students. He indicated that teachers felt more comfortable with the students coming from similar social background to themselves and were more likely to create classroom atmosphere in which students from middle and upper-middle class families would be favored. Foley (2010), in a similar vein, claimed that the cultural, social and linguistic match and mismatch between the middle-class culture of the teachers and its culturally diverse students could affect the achievement and attitude of students.

In brief, I tried to show that different cultural/social practices of different social classes were valued in a different way in elementary mathematics education. As an answer to question ‘whose life’ was presented in mathematics education discourse, my findings indicated that cultural/social practices of middle and upper-middle classes were at the focus of mathematics education. I argued that although the importance of integrating

mathematics and students' real life and solving real-life problems was well-defined in the Curriculum, the real/daily life examples encountered in textbooks and classroom practices were mainly from the daily life of middle and upper-middle classes. The gap/contradiction between what the Curriculum proposes and what curricular materials and classroom practices provided was presented as a base of reproduction of social inequalities. I claimed that the reason of this gap could be (i) the lack of emphasize in the Curriculum about social classes which had a limited/restricted voice in social life and (ii) teacher's views which conveyed her hesitations about the usage of the real life problems.

CHAPTER VI

GENDER

As mentioned in the Introduction chapter, Gender, in this study, corresponds to

> the array of socially constructed roles and relationships, personality traits, attitudes, behavior, values, relative power and influence that society ascribes to the two sexes on a differential basis. Whereas biological sex is determined by genetic and anatomical characteristics, gender is an acquired identity that is learned, changes over time, and varies widely within and across cultures. Gender is relational and refers not simply to women or men, but to the relationship between them. (The Commission for Gender Equality, 2007, p. 6)

Gender roles are one of the major social values for which educational systems have crucial role in its development and internalization. There is an enormous literature, as I tried to cover in Literature Review section, on how the content and delivery of the educational concepts reflect gender roles in a given society. These studies provided evidence on how the discourse of educational processes within the classroom contributes to the formation of gender identity and maintenance of socially accepted gender roles. In the case of Turkey, there is a growing literature highlighting male dominance in educational discourse, like other patriarchal societies.

The existing literature mainly focused on specific courses such as Turkish and Life Studies. The findings presented in this subsection aimed to contribute this literature by broadening the frame of studied courses. This broadening was not only to inquiry the idea of that education without necessary considerations cultivates gender stereotyping

but also to question the idea of that mathematics is a politically blind portion of education.

Through this section, the curriculum, curricular materials and classroom practices were analyzed in terms of whether they included positive contribution to overcome gender stereotyping/inequality or had a role in cultivating gender stereotyping. After this analysis, teacher's perspectives on gender stereotyping/inequality/equality were provided.

6.1 Gendered Discourse on Curriculum

The elementary mathematics curriculum from its general objectives to lesson plan examples did not include any reference to gender. Neither 'the vision of the program' nor 'the approach of the program' had comments on taking precautions towards gender inequality or maintaining gender equality. Enhancing/developing gender equality was not defined as one of the elementary mathematics education's general objectives. Neither mathematics-specific abilities nor common abilities which curriculum aimed students to gain included abilities related to sustain gender equality. The only place 'equality' was observed was in the name of "equalities and equations" subject. On the contrary to Turkish case, there is a consistent tendency to place 'equity' as a principal of mathematics education through the developed countries in the world. Gender equity is a vital part of these 'equity' principal. The Equity Principal in the Standards published by NTCM was a valuable example of how gender issue could be integrated into mathematics curriculum:

> **The Equity Principle:** Excellence in mathematics education requires equity—high expectations and strong support for all students.

The NCTM standards for equity encourage equal access to mathematics for all students, "especially students who are poor, not native speakers of English, disabled, female, or members of minority groups".

Another example can be found in 'six internationally agreed education goals' published by the United Nations Educational, Scientific and Cultural Organization (UNESCO):

> **Goal 5:** Eliminating gender disparities in primary and secondary education by 2005, and achieving gender equality in education by 2015, with a focus on ensuring girls' full and equal access to and achievement in basic education of good quality[4].

These examples noticeably showed that a gender-sensitive curriculum which promoted equal treatment between girls and boys and inspired them to achieve their full potential should be one of the main considerations in renewing the curriculum. This curriculum would include how teachers should interact with girls in and outside the classroom, and how boys and girls should be portrayed in textbooks. In other words, there was a need for a gender-sensitive curriculum which would encourage non-stereotyped images of men and women both in educational practices and materials.

The need for a gender-sensitive curriculum in our country was supported by the findings of a variety of related researches and reports published in Turkey (Asan, 2006; Esen, 2007; Esen and Bağlı, 2002; Kılıç and Eyüp, 2011; Otaran, Sayın, Güven, Gürkaynak, and Atakul, 2003; Ozdogru, Aksoy, Erdogan, and Gok, 2004). Ozdogru, Aksoy, Erdogan, and Gok (2004), for instance, investigated how gender roles were represented in Turkish elementary school textbooks. Their content analysis of 3rd grades Turkish and Life Studies textbooks implied that textbooks reflected the patriarchal values which put emphasis on male dominance. They indicated that since educational processes and

[4] http://www.unesco.org/new/en/education/themes/leading-the-international-agenda/education-for-all/efa-goals/

relations were the important contributors of the reproduction of gender roles, the content and context of the education should be reformed to reorganize existing social values and to afford different socialization opportunities for the girls. The lack of any reference to gender equity in mathematics curriculum implied that curriculum could be the initial place to start positive changes in terms of gender equality in mathematics education.

Kılıç and Eyüp (2011) also indicated that Turkey has signed two international treaties to develop sensitivity to gender equality in education. One of these treaties was Beijing Declaration and Platform for Action. Beijing Declaration proposed that education programs which are sensitive to gender equality should be designed and applied for all education subjects and for education level. This declaration held each participant country responsible for developing educational strategies to cleanse gender-stereotyped expressions from education programs and materials. The other treaty was *Convention on the Elimination of All Forms of Discrimination Against Women* (CEDAW). Education-related article (Article 10) of this convention proposed that

> The elimination of any stereotyped concept of the roles of men and women at all levels and in all forms of education by encouraging coeducation and other types of education which will help to achieve this aim and, in particular, by the revision of textbooks and school programs and the adaptation of teaching methods.

Despite these international treaties, Kılıç and Eyüp (2011) claimed that the cleansing of the stereotyped concepts from the education programs and materials was not addressed fully.

The 'Gender Review in Education Turkey 2003' report published by UNICEF was another source emphasizing the need for gender sensitive modules in both elementary education and teacher education (Otaran, Sayın, Güven, Gürkaynak, and Atakul, 2003). After indicating the insufficient data on gender issues in education, the report

highlighted that it was essential to undertake continuous/consistent gender analysis of education materials from curriculum to textbooks. Otaran et al (2003) claimed that these analyses could be a base for preparing future policies in modification of education programs and materials.

The studies conducted and reports published in the Europe also emphasized the need for a positive change in education programs. 'Gender Differences in Educational Outcomes' report published by the Education, Audiovisual and Culture Executive Agency was one of these reports (Eurydice, 2010). This report evaluated the current conditions of European countries in terms of gender equality in education and tried to determine a strategic road map for enhancing gender equality in education. The report concluded that almost all European countries have been planning to initiate gender equality policies in education (Eurydice, 2010) but there should be more effort for enhancing and implementing these policies. According to this report gender equality should be established as one of the main objectives in elementary education and should be regarded as one important overarching principle of the compulsory school curriculum. The report indicated that placing gender equality in specific programs and in specific subjects could not be sufficient; it should exist in the whole curriculum and it should take place throughout all subjects and areas in the curriculum (Eurydice, 2010). The report provided the expression of Maltese National Curriculum as one of the good example of the integration of gender equality into the education programs. This curriculum stated that:

> "Gender equality is not a theme that should be treated by the school in isolation or during the teaching of a particular subject. Equality should be an interdisciplinary theme which teachers can develop within the context of their particular subject, confronting prejudice and promoting more gender-inclusive alternatives" (Eurydice, 2010, p.57).

As these studies and reports suggested, education programs in general and elementary mathematics curriculum in specific should be re-organized to include strong emphasis on gender equality. The next section focusing gender stereotypes in elementary textbooks would be helpful to show how such re-organization was urgent.

6.2 Gendered Discourse on Textbooks

Gender related findings were presented in 3 main parts; (a) Job Distribution with respect to Gender, (b) Activities with respect to Gender and (c) Mothers and Fathers' roles.

6.2.1 Jobs distribution with respect to Gender

Occupational models for two genders were clearly different in the textbooks and teachers' books. As seen in Table 6.1, males were represented in higher numbers and with wider range of job opportunities than females. The number of the men represented having a job was 38, while the number of women was 22. In addition, while the men were represented in 24 different jobs, women were only represented in 9 different jobs.

Table 6.1 Jobs distribution with respect to Gender in the Elementary Mathematics Textbooks

	Male	**Female**
Teacher	(TB6, p.49) (TB6, p.181) (TB6, p.181) (TB7, p.132) (TB7, p.133) (TB8, p.114)	(WB6, p.24) (TB6, p.37) (TB6, p.41) (WB6, p.41) (TB6, p.177) (TB6, p.183) (TB6, p.202) (TB7, p.79) (WB7, p.73) (TB7, p.132) (TB8, p.110) (TB8, p.114) (TB8, p.122) (TB8, p.138)
Waiter	(WB6, p.24) (TB6, p.206)	
Coach (of a sport team)	(TB6, p.31)	
Tea Seller	(TB6, p.31)	
Operator of a canteen		(TB6, p.47)
Salesperson	(TB6, p.50) (WB6, p.173)	
Business Owner	(TB6, p.52) (TB6, p.254)	
Representative	(WB6, p.55)	
Seller of dried fruit and nuts	(TB6, p.57)	

Table 6.1 Jobs distribution with respect to Gender in the Elementary Mathematics Textbooks (Continued)

Dentist	(TB6, p.57)	
Simit seller	(TB6, p.58)	
Fisherman	(WB6, p.107)	
Nurse		(TB6, p.122) + *
Zoo workers	(WB6, p.123) +++	
Baker	(WB6, p.127)	
Restaurateur	(WB6, p.127)	
Cleaning Worker	(TB6, p.139)	
Author (novel)		(TB6, p.142)
Cashier		(TB6, p.150)
Carpet weaver		(WB6, p.159) ++
School Administrator	(TB6, p.168) (TB6, p.204)	
Farmer	(TGB6, p.175)	
Craftsman (construction) (textile) (paint)	(TGB6, p.183) (TGB6, p.183) (WB8, p.197)	
Interior Designer	(TB6, p.209)	
Administrator	(WB8, p.110)	(WB6, p.231) (WB8, p.66) (WB8, p.110)
Dolphin Trainer	(TB7, p.73)	
Manufacturer	(TB7, p.74)	
Wholesaler	(TB7, p.98)	
Engineer	(TB8, p.120)	

* Each plus sing indicates one more example in the same page

When the characteristics of the occupations were examined, it was seen that women were demonstrated basically in traditional/conventional works such as teaching, nursing, or carpet weaving. Another point that should be noted here was the gender of school administrators. While most of the teacher characters were female in the questions, all of the school administrators (although the number was only two) were male.

On the contrary to imbalance in the job distribution, the genders of students were distributed equivalently in textbooks' problems. The numbers of boys and girls who were presented as a student in the problems were equal.

The emerged picture about jobs' distribution with respect to gender was consistent with the findings of other studies researching textbooks in Turkey. The work of Helvacıoğlu (1996), "Sexism in Textbooks", investigated textbooks published in a long period from 1928 to 1995 in terms of sexist expressions and pictures. Helvacıoğlu indicated that there was a consistent tendency in these textbooks which rarely portrayed them in business life and generally confine women into home. She also claimed that while teachers were women most of the time in textbooks, the school principals were always men.

In addition, with their research on the presentation of gender roles in Turkish elementary school textbooks, Ozdogru, Aksoy, Erdogan, and Gok (2004) highlighted the differences in occupational models for two genders in textbooks. Their study showed that male figures in textbooks were demonstrated in a wider range and higher level job opportunities than female figures and female figures were demonstrated less as a working person and more in conventional and lower level works such as teaching, nursing, and agricultural fieldwork. Similar to findings of the present study, the only exception in their study was the extensive description of female teachers. Esen (2007) also pointed out the high frequency of female teachers in textbooks but indicated that this situation should not be considered as a positive change in textbooks. She, on the

contrary, explained this high frequency as a result of the fact that this profession was in congruence with the traditional gender roles in Turkey. Esen (2007) emphasized the difference in the status of the jobs of the male and female figures in textbooks. She indicated that while male figures were demonstrated in "executive, decision- maker and inspector roles, such as market manager, school principle, judge, mayor or governor", female figures were demonstrated in "low-status supportive jobs, such as sales staff and clerk working under the supervision of a male manager" (Esen, 2007, p.10) .

Moreover, in a more recent study, Kılıç and Eyüp (2011) found that in terms of job opportunities, male figures were shown in more various jobs than female figures. In one of the two books they analyzed, while women were presented in only 3 different occupations, men were presented in 19 different occupations and women were presented in only 8 different occupations while men were presented in 27 different occupations in the other book. They displayed that while the occupations of male figures showed diversity such as writer, teacher, civil servant, athlete, weightlifter, doctor, fishermen, woodcutter, florist, judge, tailor, governors and academician, female figures were, again, represented almost only as teacher. Similarly, Çubukçu and Sivaslıgil (2007) presented their findings about gender's job distribution for English textbooks; while women were seen in 11 different occupations in textbooks, men were seen 17 different occupations. Their study also implied that women were pictured in occupations which were socially attributed to women such as teacher, nurse, and cashier.

To conclude, the job opportunities provided in mathematics textbooks shown basic gender-stereotypes which also observed in the other textbooks from different subject matters; male figures were represented in more variety of occupation than female figures and female figures were depicted generally in typically female jobs. The following section would resume this analysis in the activities of the two genders observed in the textbooks.

6.2.2 Activities with respect to Gender

The distributions of the activities for two genders showed also visible differences. The activities with respect to gender in the elementary mathematics textbooks can be seen in Table 6.2.

Table 6.2 The Activities with respect to Gender in Textbooks

Female	**Male**
The top view of a box of buttermilk that Emine bought is given below. (WB6, p.24)	Ahmet will plant tomato in the larger part of his garden and pepper in the other part. (WB6, p.26)
Aysel will prepare a meal for her guests. (TB6, p.38)	Murat gets on a taxi in front of his house to go to work. (WB6, p.55)
After shopping, Nurcan returns home with a taxi. (WB6, p.55)	Ayhan usually prefers to use plane for his business. (WB6, p.55)
Zehra is shopping by using a credit card. (TB6, p.64)	Haluk wants to make a regular polygon table for his family. (WB6, p.88)
Selma orders 3 shirts from a catalog. (TB6, p.139)	Yavuz bought a car for the price of 6600 TL. (TB6, p.159)
Meryem wants to pour the oil in the can to the half-liter bottles. (TB6, p.154)	Mehmet pays 55 kurus for his daily newspaper and 2,5 TL for his weekly newspaper. (TB6, p.201)
Kezban wants to pour 20 lt fruit juice to the 7/10-liter bottles. (WB6, p.157)	Alp goes to fishing for resting. (TB6, p.207)
Nazlı baked a cake with the 2/5 of 1/4kg peanut. (TB6, p.159)	Selim has 2500 m2 garden. He builds a house to 1/5 part of his garden. He plants apple trees in 4,5 are of the garden and plants flowers in the remaining part. (TB6, p.227)
Aysun went shopping for her sister's birthday party. (TB6, p.159)	Selçuk who makes advertisement for a product organizes meetings. (TB7, p.77)
Yeşim made a cake for her family and divided it into 8. (TB6, p.159)	Mustafa ties the tree branches in his garden with a thick rope. (TB8, p.85)
Nevin bought a blanket by paying 2/5 of its price with cash. (TB6, p.184)	Ahmet used ¼ of milk to make a cake and used the half of remaining to make a desert. (TB8, p.138)

Table 6.2 The Activities with respect to Gender in Textbooks (Continued)

Asuman puts 10 different-color shirts to the washing machine. (TB6, p.185)
Leyla makes cookies for her guests. (TB6, p.194)
Neslihan had 100 TL for shopping in the beginning of the week. (WB6, p.195)
Nimet goes to market to buy her home needs. (WB6, p.202)
Elif cuts a piece of fabric to make a table cloth. (TB6, p.212)
Zeynep used 250 gr ground meat to cook stuffed vegetables. (WB6, p.222)
Emel has 7,5 m^2 fabric. She sews a skirt for herself with its 150 dm^2 and a sew for her daughter with its 5000 cm^2. (TB6, p.227)
Çiğdem wants to buy a curtain for her new house and order for it. (WB6, p.231)
Before her business trip to Germany, Nermin wants to exchange her money to Euro. (TB7, p.138)
Dilek invites her friends to her birthday party. (WB8, p.110)
Serap goes to mall for her holiday shopping . (WB8, p.114)
Elif goes to greengrocery to shopping. (WB8, p.114)
Emel wants to use 4 of 10 different patterns to knit a sweater. (TB8, p.122)
Burcu prepares a meal table for her guests. (TB8, p.122)
Esma bought one half of the fabric. (TB8, p.122)
Zuhal is interested with mountaineering and wants to climb a mountain in her city. (WB8, p.196)

As can be seen from the table, the number of the activities which women took roles was higher than the activities which men took roles. However, when the characteristics of these activities were investigated, it was seen that males and females were mostly represented in gender-stereotyped roles. For example, while women were described as *preparing a meal for her guests, shopping for her birthday party, making a cake for her family or sewing a skirt for herself,* men were described as *going to work, organizing meetings, building a house, planting a fruit, or fishing for resting.* This description of women implied that mathematics textbooks perceived women as a housewife.

The reduction of women's role in the society into a housewife was not unique to mathematics textbooks and emphasized also for different subject matters' textbooks (Esen and Bağlı, 2002; Esen, 2007; Helvacıoğlu, 1996; Kılıç and Eyüp, 2011). Esen and Bağlı (2002), for instance, investigated the adult figures on the pictures in the elementary schools' Turkish and Alphabet textbooks in terms of their actions and places where they were presented. Similar to findings of this study, they concluded that while women adult characters were pictured in home or home environment, male adult characters were pictured in the actions related with public and work. They also indicated that female characters were displayed primarily with their children and in actions related with their children and were pictured rarely with their workmate and in actions related to their occupations. They added that male characters, on the other hand, were displayed primarily in their workplace and in actions related to their occupations.

Furthermore, Kılıç and Eyüp (2011) identified similar positions in terms of gender-stereotypes in adults' activities in textbooks. Their content analysis of textbooks indicated that female characters were portrayed mainly as dealing with their children, cleaning their homes and cooking, while male characters were portrayed as providing the living of the family, dealing with their own business and repairing their homes. Kılıç and Eyüp claimed also that not only the activities were different but also the personal characteristics of women and men were considerably different in textbooks; while

women were represented as emotional, shy, vulnerable, caring, loving, enthusiastic, self-sacrificing/devoted, unstable, gossipy, helpless, a cry baby, coward, elegant, and curious; men were represented as courageous, benevolent/helpful, sensitive, brave, shy, loyal, well-informed, sociable, self-confident, strong, and determined. They concluded that "in sexual roles regarding personality, women are portrayed as weak and passive and man are portrayed as strong and clever individuals" (Kılıç and Eyüp, 2011, p.130).

To sum up, the activities of male and female adults in elementary mathematics textbooks reflected the similar gender-stereotypes which were highlighted in previous researches implemented in different subject matters. While female adults were seen in activities related to being a housewife, male adults were seen in activities related to their occupations. The following section would resume this analysis in the roles of fathers and mothers observed in the textbooks.

6.2.3 Fathers' and Mothers' Roles

The description of the roles attributed the fathers and mothers in the textbooks were presented in Table 6.3. The cases provided in this table provided the opportunity to investigate how fathers' and mothers' roles in a family life showed observable differences.

Table 6.3 Fathers and Mothers Roles in the Elementary Mathematics Textbooks

Mother	**Father**
His mother wants Ahmet to buy the foods written in the shopping list. (TB6, p.35)	Selim wants to register his daughter to the school in their new neighborhood. (TB6, p.53)
Hasan prepares halvah with his mother for his friends. (WB6, p.49)	The window in Mehmet's room was broken. His father changed the window broken glass. (WB6, p.91)
Meral is a 6-month baby. She becomes sick and has a fever. Her mother takes her to the doctor. (TB6, p.52)	Orhan and Erhan want to share the 56 TL allowance given by their fathers. (WB6, p.167)
Hüseyin saw that each egg in the egg box that his mother bought weights 60 gr. (WB6, p.55)	Her father bought a beautiful bookcase to Havva for her success in the lessons. (TGB6, p.182)
Erhan' mother is going shopping for the religious holiday. (TB6, p.142)	Their grandfather gave 80 TL allowance to Berna and Davut. (WB6, p.186)
Meral and her mother are going for shopping. (WB6, p.188)	Ali's father pays 2,75 TL for his weekly news journal. (WB6, p.201)
His mother measured the fever of Emrehan who became sick because of getting caught in rain. (TB6, p.195)	İbrahim and İsmail want to share their father's legacy equally. (TB6, p.232)
Merve's mother will prepare sandwiches for the picnic. (TB6, p.199)	In his testament, Şakir wanted his money to be distributed to his daughters, Ayşe, Fatma, and Oya in the proportion of 2:3:4 (TGB7, p.104)
Ezgi, who loves to decorate cakes, wants to decorate her mother's cake with parallel lines and strawberries. (WB7, p.44)	

As can be inferred from the difference of their activities, fathers' and mothers' roles described in the textbooks were reflections of a patriarchal family. The father figure was the one who was responsible for the finance of the household: he gave allowance to his children, he left legacy to his children, or he bought a present for his children. The father figure also dealt with the repair of his home and read journals/newspapers.

Most of mother characters, on the other hand, were seen in works related to being a housewife and child-raising. The mother figure was the one who prepared cake/sandwiches with her children and dishes for the meal. The mother was also the one who went shopping with her children. In addition, when the child was ill, the mother was the only one who dealt with her child.

These findings of the current study supported the findings of previous research investigating the description of mother and father figures in textbooks (Asan, 2010; Esen, 2007; Ozdogru, Aksoy, Erdogan, and Gok, 2004). The findings of the study of Ozdogru, Aksoy, Erdogan, and Gok (2004) who analyzed the family illustrations in the textbooks highlighted that textbooks provided patriarchal families in which fathers worked out of the home to sustain the living of the family and mothers were responsible for within house matters such as kitchen and child-care. Their findings also pointed out that while mothers were seen mostly in loving relations with their children, fathers were portrayed as the information and economic/money source for their children. Asan (2010) also provided similar description of family life in her inquiry of primary schools' textbooks. She asserted that being father was associated with working outside of the home and financing the needs of their families, while being mother corresponds to cooking, cleaning, and child-caring in their homes.

Moreover, Esen (2007), in her investigation of reform-based textbooks, claimed that the illustrations and pictures of the families in textbooks was a representative of a patriarchal family. She indicated that as in the older edition of the books, reform-based textbooks also described the father figures as coming from shopping with hands full,

watching television and holding the remote controller in his hand, and being responsible for working outside and financing the living of the household. Mother figures, on the other hand, were described as preparing the dinner table, dealing with their children and shopping for the needs of their home in these textbooks. Esen added that father figure was the one to whom the child consults or asks permission for something. The findings of the present study showed that although mathematics textbooks did not include such kind of illustrations and pictures, the context of the mathematics problems was almost identical with these pictures.

When the findings related to textbooks were considered together, it could be concluded that males and females figures were presented in highly gender-stereotyped ways in terms of their occupation potentials, their activities and their roles as fathers and mothers. The only remediation observed in the textbooks was that the number of female figures in the context of mathematics problems was almost equal to the number of male figures. The elimination of this numerical inequality between the representations of two sexes was of course favorable alteration but it was not sufficient to eradicate the gender-stereotyped contexts in textbooks. As Esen (2007) nicely indicated "what is important here is not how often the women and the girls are portrayed, but the way they are portrayed" (Esen, 2007, p.9).

6.3 Gendered Discourse on Classroom Practices

The first point analyzed through observations was whether the context of problems had similarities with the textbooks in terms of gender or not. However, the teacher did not use any different example including gendered expression similar to observed ones in textbooks. Then, the analysis moved towards how girls and boys were treated in the classroom.

The main types of sex bias which had consistently been observed in classroom settings were: (a) boys received more attention from teachers and were given more time to talk

in classrooms than girls, and (b) boys received more praise, critical feedback, and remediation than girls (Sadker, Sadker and Klein, 1991). When the classroom practices were analyzed with the light of this perspective, it was seen that there was no significant difference in terms of attention received from teachers.

It was observed that teacher let students solve the question in the board 144 times through the observed class hours during the semester. Eighty-six (almost 60%) of them were girls and 58 (40%) of them were boys. As stated in the methodology, the class size was 28, including 15 girls (almost 54%) and 13 boys (46%). Girls had received slightly more attention from the teacher than boys. But this difference probably was not a result of gender but achievement. As it was indicated by teacher in the next sub-section, girls were slightly more successful in the mathematics lessons in this classroom.

It would be beneficial to provide an example from how students reacted when they felt that they were treated differently by the teacher. Following example was from the solution of a probability question (24.03.2010):

> *T: Ok, write the question. 2 red, 3 yellow, and 4 blue marbles were put in the same bag. When a marble is drawn randomly from the bag, a, what will be the possibility of drawing red marble b, what will be the possibility of drawing blue marble, c, what will be the possibility of drawing red or blue marble, d, what will be the possibility of drawing black marble?*
>
> *(after a minute, students started to raise their hands)*
>
> *T: Ahmet, come!*
>
> *Ahmet: (on the board) In total there are 9 marbles.*
>
> *(he wrote) P(R) = 2/9*
>
> *T: Who will do b? Nesrin.*
>
> *Nesrin: Four over nine. (she wrote) P(B) = 4/9*
>
> *T: let's do c. Sultan.*

Necmi: Teacher, you always let Sultan. I did not come to the board for 2 weeks.

Ozan: Yes, teacher, you always choose from the ones sitting in the fronts. You do not look that way.

As can be seen from the dialog, students who were uncomfortable with teacher's choices complained about the lack of attention they received. These complains were generally not based on the gender but on the individuals as "*you always let …".* There were also complains based on gender such as 'you always choose girls' or 'you always choose boys'. However, as the numbers were presented above, there was no drastic difference. Those gendered complains seemed to mainly aim to let teacher to choose student who complained to provide a response or a comment.

6.4 Gendered Discourse on Teacher's Views

The first question related to gender issue was a general question about whether mathematics education included any sign of eliminating or reproducing gender discrimination. Teacher responded:

Mathematics education and gender discrimination … I did not see any relation. In my opinion, mathematics education does not include any discriminatory expression. I mean, I did not confront anything like that. There is nothing different either for boys or for girls. They are treated similarly.

When the question addressed to the curricular materials, she stated:

For textbooks or guide book? I did not confront any discriminatory expression, either. As I said before, we work on mostly with numbers; there is nothing that can make difference for boys or girls. Numbers are same for both boys and girls. Textbooks ask the same thing to girls and boys, I mean, they don't consider them differently in any topic.

Teacher's comments implied that she was not aware of the current gender-stereotyped context of curricular materials. It could be claimed that this unawareness could be one of the important reasons for the permanency of the discriminatory expressions in mathematics education in general and in mathematics textbooks in specific.

The teachers' and teacher candidates' conceptions of gender stereotyped context in curricular materials were investigated in recent years through different studies (Asan, 2006; Kızılaslan, 2010). In her analysis of teachers' perceptions of gender discrimination, Asan (2006) showed that the awareness of teachers about the gender stereotyped items in textbooks was not strong enough. She added that this lack of awareness did not show any significant difference between male and female teachers. The research of Kızılaslan (2010) would be helpful to understand the reasons of this lack of awareness. Kızılaslan analyzed how English language teaching (ELT) teacher candidates perceived gender stereotyped contexts in textbooks. Her interviews with the teacher candidates revealed that according to them, it was necessary to avoid discussion on gender-based issues in their classrooms. Kızılaslan expressed that "most of the interviewed student teachers did not feel comfortable having class discussions on the portrayal of males and females in school texts since they perceive this option as potentially controversial and divisive" (Kızılaslan, 2010, p.3530). These findings of Kızılaslan's study implied that education faculties have an important responsibility in raising gender-sensitive teachers.

When I asked her to identify gender differences in classroom practices and in her behaviors, she claimed that:

> *No, never, I never behave differently to any of my students: Neither to girls nor boys, neither to poor nor rich, neither to successful nor unsuccessful. Maybe my relation with the girls in this classroom is a little better since they are more respectful than boys, however, I do not behave differently to them in the lesson or in the examinations. I try to give everybody equal*

> *chance to come to blackboard and to solve the questions. I do not show any favor to anybody while assessing the examinations or assigning the grades. … Anyway, when students think that they are behaved differently, they immediately intervene by saying, for example, 'teacher, you always give chance to them' or 'teacher, you forgot me'. In addition, I did not hear any complain from my students or from their parents about this subject.*

My classroom observations provided above supported the teacher's comments on her behaviors. At that point, it would be beneficial to refer the arguments of Asan (2010) in respect of teachers' roles of reproduction of gender stereotypes. Asan argued that to what degree teachers are aware of gender discrimination in the society and in the education is very crucial to change these discriminatory practices. It can be concluded that although the views of the participant teacher enabled her to avoid gender discriminative actions, her views could not direct her to identify and react against to current gender-stereotyped discourse.

Her comparison of the girls' and boys' mathematics achievement addressed that:

> *I can say that the girls in this classroom are more successful than the boys. I do not know how the boys were assigned to this classroom but they are mostly hopeless, most of them are lazy, they are not interested in the lesson most of the time. But this is the case for only this classroom. For example, in one of my 6th grade classrooms, boys are more successful. In general, I do not think there is an achievement difference.*

When the question continued with the students' aptitude towards mathematics, she expressed that:

> *From my observations, I cannot say whether girls or boys are more talented. In the past, some people said that boys were more talented in mathematics, or they said that boys were more successful in mathematics parts of the national examinations,*

> *but I did not observe any difference in my students' talents with respect to gender. There are some students to whom I can call as 'very talented' in every lesson, and there are some students who are not 'talented' in any of the lessons. Some of them are girls, some of them are boys.*

In addition, her views about the difference in attitude towards mathematics were as below:

> *For this classroom, I can say that girls have more positive attitude towards mathematics; besides, it is the reason for why they are more successful in mathematics. If their attitudes were not positive, they couldn't do mathematics. I think, if you don't love mathematics, you have no chance to be successful in it. Maybe you can be successful in other lessons, although you don't like them, but this is not valid for mathematics. You have to love it to achieve.*

It could be inferred from teacher's answers that she was attentive enough to let her students participate classroom practices equally. Her attentiveness was supported by both her thoughts and classroom observations. On the other hand, since this attentiveness was limited to only students' participation in classroom, she could not contribute to eliminate deficiencies about girls' lack of representation in math-related branches. In addition, teacher's lack of awareness about the gender stereotyping in curricular materials could be one of the reason of maintenance of stereotyped expressions.

The participant teacher's indication of equality in girls' and boys' mathematics achievement and attitudes towards mathematics implied that her overall assessment of their students were free of gender bias. This finding was not compatible with the findings of Tiedemann (2002). Tiedemann identified considerable difference in mathematics teachers' conception of their students' academic abilities. He argued that mathematic teachers considered that their average achieving girls are less talented than

equally achieving boys and they rated mathematics as more difficult for average achieving girls than for equally achieving boys. The reason of the incompatibility between the findings of current study and Tiedemann study would be that the participant of this study was female. For instance, Asan (2010) indicated that the views of male teachers about their classroom practices and relationship with students included more discriminatory expressions than their female colleagues.

Lastly, it would be beneficial to remind the teacher-related findings of the 'Gender Differences in Educational Outcomes' report published by Eurydice (2010); "even when teachers believe that they treat their students equally, they are more likely to chastise male students and pay them more attention, while at the same time creating greater dependency in their female students" (p.29). When teachers are not aware of this danger and also not aware of the existing discriminatory contexts of social and educational spaces, then it would be almost impossible to convert these contexts. On the other hand, when teachers have the knowledge of gender-stereotyped discourses and desire to transform them, then they can play a fundamental role in developing gender-sensitive educational practices. Teachers "have chance to encourage both critical thinking and a questioning of gender stereotypes. It is therefore important to ensure that future and serving teachers receive training on these issues and have access to ample information on gender topics" (Eurydice, 2010, p.89).

As a summary, our analysis revealed that curricular materials and specifically textbooks, instead of including positive contribution to overcome gender stereotyping/inequality, had a role in cultivating gender stereotyping. The lack of emphasize on gender equality in curriculum and gendered discourse observed in the textbooks with the analysis of (i) job distribution with respect to gender, (ii) activities with respect to gender and (iii) mothers and fathers' roles provided the signs that support this argument. On the contrary to curriculum and textbooks, teacher's practices and views presented an indication of sensitivity about the gender issue.

CHAPTER VII

NATIONALISM

Nationalism is considered as one of the main ideology that each individual should share in a nation-state. In Turkey, similar to other nation-states, nationalism is believed to be a central connector of social unity and parallel to this belief, it is given a significant place in educational objectives (Kaplan, 1999). It is claimed that public education is one of the means used for constructing the national self, and that these constructs, reflected in the educational contexts, employ the discourses of nationalism to set the restrictions of the national self in specific ways (Kancı, 2007). Militarism also was considered as one of the key complementary of nationalism in this role (Bora, 2003).

It is difficult to mention about the one and always valid definition of nationalism but it is generally thought in a range from a flexible and more open to democratic values to rigid and closed one. The two opposite poles of the definition of nationalism can be drawn as; one is defined on the basis of citizenship which also includes adherence to the laws and the constitutional values (such as, French nationalism in the late 18^{th} century) and the other is defined on the basis of a specific race which emphasizes the uniqueness and superiority of this race (such as, German nationalism in the mid-20^{th} century) (Bora, 2003). Nationalism, as can be understood from its definitions, can have different roles in terms of human rights in different time and society settings.

Although public education, in general, and mathematics education in particular, can neither be regarded as the main source of nationalism in Turkey, nor as the main reason behind the militarist discourse in the country, they are nevertheless influential elements (Kancı, 2007). In this section, the nationalist expressions in the elementary mathematics

education discourse was examined and interpreted with the awareness of the mentioned range of nationalism.

The pre-analysis of nationalist discourse revealed that the findings in the curriculum, textbooks, classroom practices and teachers views were not rich enough to present and interpret these findings separately. Different from the previous findings sections which were about the neo-liberalism, class culture, and gender, it would be more meaningful and functional to present 'nationalism' with a holistic approach. I started the analysis with the general objectives of Turkish National Education and continued with the reflection of these objectives in mathematics curriculum, textbooks, and classroom practices. However, instead of classifying the findings with respect to these headings, I preferred to introduce them with respect to emerged themes. Lastly, I provided the teacher's view about the relationship between mathematics education and nationalism.

7.1 Nationalist Discourse from General Objectives of Turkish National Education to Classroom Practices

Before providing the mathematics related examples of the nationalist discourse, it is beneficial to quote the roots of this discourse in the Objectives of Turkish National Education. The aims and principles of Turkish National Education given in the beginning of the elementary mathematics curriculum were defined as follows:

> *1. To raise individuals who are committed to Atatürk's reforms and principles, his concept of nationalism as defined in the Constitution; who adopt, protect, and improve the national, moral, human, intangible, and cultural values of the Turkish nation; who love and always elevate their families, homeland, and nation; who are aware of their duties and responsibilities towards the Turkish Republic -which is a democratic, secular and social state ruled by law based on human rights and the basic principles defined in the beginning of the Constitution- and behave accordingly;*

> *2. To bring up individuals who physically, mentally, morally, spiritually, and emotionally have a moderate and healthy personality and mentality, independent and scientific thinking power, a wide world view; who respect human rights, appreciate enterprise and individuality; who feel responsibility towards the society; and who are constructive, creative, and productive;*
>
> *3. To prepare individuals for life by ensuring that they have professions which will make them happy and contribute to the welfare of the society through equipping them with the necessary knowledge, skills, attitude, and habit of working cooperatively in line with their own interests, talents, and abilities.*
>
> *Thus, the aim is to promote the welfare and happiness of the citizens and Turkish society, to support and accelerate economic, cultural and social development in national unity and cohesion, and finally to make the Turkish Nation a constructive, creative, and distinguished partner of contemporary civilization. (EME Program, 2009, p.5)*

The first critical point essential to be emphasized here was the presentation of Turkish nation as the only nation in Turkey and nonappearance of any comments about multicultural social structure of Turkey. The nationalist character of these general objectives and ideology of education system was discussed different comprehensive studies (Bora, 2003; Çayır, 2009; Kancı, 2007; Kaplan, 1999). However, since there was no mathematics-specific content in these aims, it would be beneficial to focus on mathematics education textbooks to observe the possible reflections of these general objectives.

The first point drawn from the analysis of textbooks compatible with these general objectives was the usage of cultural values/constructs of all nations in Turkey as if they only belonged to Turks.

> *Concepts of this unit become concrete with the help of the models in the students' environment and in the Turkish culture. (TGB6, 2009, p.59)*
>
> *The art of tile-making has an important place in Turkish ceramics. The above figures provide examples of tiles composed of geometric shapes. (TB6, 2009, p.84)*
>
> *Every corner of Anatolia is famous for its hand-weavings. The following figure is an example of a shirt cutting model used by Turks in Anatolia. (TB6, 2009, p.91)*
>
> *Folk dances are essential parts of Turkish culture. (TB6, 2009, p.152)*
>
> *The Selimiye Mosque, one of the greatest works of Ottoman-Turks architecture, was built in Edirne, the capital city of the time by Mimar Sinan (TB8, 2009, p.148)*

The cultural constructs and artifacts such as *hand-weavings, folk dances, or ceramics* in e*very corner of Anatolia* were presented as the products of only Turks. Other ethnic and/or non-Muslim groups living in Anatolia/Turkey were ignored throughout the curricular materials. Overlooking the existence of various ethnic groups or non-Muslim citizens was the reflection of assimilating policies directed towards all non-Turkish-speaking and non-Muslims in Turkey. Mathematics curricular materials provided an example of constructing the Turkish nation on the basis of a single religion (a Sunni version of Islam) and a single language (Turkish).

The absence of reference to non-Turkish and non-Muslim groups in education programs, texts, and practices was underlined consistently in the contemporary sociological analysis of Turkish education system. For example, the report of Minority Rights Group International, called "Forgotten or Assimilated? Minorities in the Education System of Turkey", provided extensive examples about how minority communities were treated in Turkish education system. Kaya (2009), as a writer of

these report, indicated that while distinct minorities' cultures, religions and histories were unnoticed in education system, Turkish identity and nationalism were promoted as essential principles of it. She claimed that while Turkey is historically home to many ethnic, religious and linguistic minorities, including Armenians, Assyrians, Greeks, Lazs, Keldanis, Kurds, and Yezidis, there is no educational text or practice which promotes the cultures of them. After the examination of the education conditions of minorities in Turkey in comparison to international standards, Kaya argued that there is a constant discrimination and lack of tolerance in school books and education; (i) "the religions of various minorities in Turkey are not adequately covered or given equal weight to Sunni-Islam in the curriculum" and (ii) "no special events are systematically organized to introduce minorities' cultures to school children" (Kaya, 2009, p.26). The views and feelings of members of minority communities also supported this lack of tolerance. Kaya concluded from her interviews with the members of minority communities that they had the fear of that the education system works to assimilate them and ultimately their distinct identities will disappear. The findings of this study showed that mathematics education, unfortunately, was not an exception in terms of tolerance to ethnic and religious minorities.

Moreover, Kancı (2007) examined the nationalism and militarism in primary school textbooks and concluded that the discourse of the textbooks bear the trace of ethnic-racist conception of nationalism. She argued that the nation and national identity, in other words 'being Turk', was presented as the essential part of a citizenship. According to her, this brought that "certain groups of people are denigrated and discriminated against in the textbooks; differences are not welcomed, pluralism is not valued but suspected" (Kancı, 2007, p.71). In addition, Kancı indicated that the "internal others" who were not the carrier of this national identity were portrayed in the textbooks as outcasts, degenerates, and/or traitors and blamed for being indolent, cowardly, ignorant, and/or backward-minded. Although the case of mathematics education did not provide

such severe examples, it could be argued that the absence of non-Turkish and non-Muslim groups in mathematics education context would contribute this perception.

Furthermore, the work of Çayır (2009), investigating nationalism, national identity, and 'otherness' in Turkey's new textbooks provided findings in line with the findings of the current study. Çayır indicated that ethnic, religious or language-related differences received no attention in the new textbooks and the culture and history of non-Turkish and non-Muslim minorities had been systematically excluded from the 'legitimate knowledge' provided by the education programs. Çayır argued that although social reforms in the context of the European Union membership procedures has provided a suitable ground for integrating ethnic minorities' cultures and identities into the education system, this integration is still considered to be a threat to national unity in Turkey. With his own words, "pointing out national diversity and ethnic difference in schoolbooks is still unthinkable in Turkey. The new textbooks in this sense are far from promoting an inclusive national imaginary in pupils" (Çayır, 2009, p.48).

On the contrary to absence of non-Turkish and non-Muslim communities in the mathematics education context, different characteristics of the Turks were praised continuously in the mathematics textbooks. When the curricular materials were examined, the following texts were arisen as the praises for the Turkish culture, sport, values, location, and production.

> *Cultural treasures in the photograph can be examined, and so the importance of location of our country can be highlighted. That can be a tool for increasing students' motivation for the overall unit. (TGB6, 2009, p.13)*

> *The Turkish people reflect their taste, aesthetics, sensuousness, tolerance and practicality with the handicrafts they produced. The excellent examples of traditional Turkish handcrafts such as carpets, embroidery and fancywork, are the documents that*

describe 'beauty in art'. Tessellations hold an important place in Turkish handicrafts. (TB6, 2009, p.59)

Turkish cuisine alongside Chinese, Italian, French, and Mexican cuisine is one of the world's most famous five-cuisines. A list of necessary materials for the preparation of cheese halvah which belong to Turkish cuisine are given below. (TB6, 2009, p.144)

Turkish athletes won 30 gold, 16 silver and 13 bronze medals, 59 medals in total, in Olympic Games. Thus, Turkey is the 34th of 119 countries and Turkish athletes left behind athletes from 85 countries in total medal rankings. According to the ranking of the number of gold medals, Turkey is the 28th country. This is a source of pride for the Turkish sport. (TGB6, 2009, p.214)

The most important characteristics of Safranbolu which makes it famous in our country and the world, is its traditional Turkish style of architecture called Safranbolu Houses. There are about 2000 traditional Turkish house. What kind of geometric shapes do you see in Safranbolu Houses? (TB6, 2009, p.228)

The mountain climbers who climb the five mountains in Asia with at least 7000 meters height are called as "snow leopard". Ali Nasuh Mahruki who was called also as 'snow leopard', climbed to the top of the world's highest peak, Everest in 1995. By being the first Turks sportsman with such a success, he has written the name of Turkey to the world history with golden letters. (TB7, 2009, p.102)

As seen in the examples, the contexts of the problems were designed to make students be proud of some characteristics of Turkey. The superiority of Turks in culture, sport, architecture, or cuisine was emphasized while constructing the problem situation. The reason of this emphasis was provided in the first example; *that can be a tool for increasing students' motivation for the overall unit.* The use of such nationalist contexts

underlining superiority of a nation as a motivation tool was an indicator of where mathematics education was placed in the range of nationalism.

For example, when the sentence "*Turkish people reflect their taste, aesthetics, sensuousness, tolerance, and practicality with the handicrafts they produced"* was considered, it could be argued that the universal values such as *sensuousness, tolerance, and practicality* were presented as they only belonged to Turkish people. Çayır (2009) underlined the same point in his study for different values such as 'peace-loving', 'respect for other cultures' or 'benevolence'. He indicated that these universal ideals and values were confined to the Turkish nation in order to develop a sense of 'we'. Çayır claimed that such demonstrations and narrow-minded nationalist discourses was an example of "how even universal values can be employed not to unite people but to set the Turkish nation apart from other nations" (Çayır, 2009, p.51).

The nationalist discourses in mathematics education were not limited to the absence of ethnic and religious communities' cultures and the indication of the Turkish superiority in different areas. The intensive reference to Kemalism in the educational objectives and the presentation of Atatürk as a mathematician in education program and textbooks could be considered as the continuum of the nationalist discourse in mathematics education. In particular when the replacement of "Turkish nationalism" with "Atatürk's nationalism" in The 1983 Basic Law of National Education after the 1980 military coup was considered, interpreting Kemalism in the course of nationalism would be more meaningful (Kancı, 2007).

The first aim of Turkish National Education given above was very informative about the position/ideology of education system in Turkey: *To raise individuals who are committed to Atatürk's reforms and principles, his concept of nationalism as defined in the Constitution; who adopt, protect and improve the national, moral, human, intangible, and cultural values of the Turkish nation.* It can be inferred from this objective that the name of Atatürk and his reforms and principals were used to

legitimate Turkish nationalism. Mustafa Kemal Atatürk was credited as being the founder of the Republic of Turkey and was treated with great respect among citizens of this country. Being aware of this respect, the name of Atatürk was used in this objective to legitimate the emphasize on 'nationalism'. The nationalist argument/context in the objective – the presentation of universal values that would belong to all humanity, such as *moral, human, and intangible values,* as if they only belonged to Turkish nation – was normalized and legitimated by using the name of Atatürk.

Parallel to general objectives, elementary mathematics curriculum referred to Kemalism in specific areas. However these references were not related directly to nationalism but served nationalism by glorifying Atatürk. The most prominent example was the presentation of Atatürk as one of the important contributors of Mathematics. One of The Project Homework given in the curriculum provided an informative example;

> *An example of The Project Homework*
>
> *The life of the contributors of the mathematics (Atatürk, Pythagoras, Thales, Escher and etc.) (EME Program, 2009, p.108)*

As seen in the Project Homework, Atatürk was considered as one the important mathematician in the world and mentioned next to famous mathematicians such as, *Pythagoras, Thales, and Escher.*

Parallel to the presentation of Atatürk as a mathematician, some 6^{th} and 8^{th} grade educational objectives emphasized how Atatürk's works were vital in mathematics education.

> *6^{th} grade objective: To explain the necessity of innovations brought to units of measurements under the leadership of Atatürk with its reasons. (EME Program, 2009, p.118)*

> *8th grade objective: To explain the importance of Atatürk's works in mathematics. (EME Program, 2009, p.290).*
>
> *An activity related with this objective: Investigate the book "Geometry" written by Atatürk wrote and emphasize the importance of Turkish words that Atatürk found as replacements of geometry terms. (EME Program, 2009, p.304)*

The curricular materials also included examples of presenting Atatürk as a mathematician:

> *The need for innovations in units of measurement introduced under the leadership of Atatürk. (TGB6, 2009, p.143A)*
>
> *The innovations Atatürk brought to measurement units. (TB6, 2009, p.173)*
>
> *Kemalism is one of the objectives in the sub-section of triangles (TGB8, 2009, p.71A)*
>
> *Project Homework: Scientists in mathematics. Dear students, the name of some scientists are given below. Investigate their researches and inventions and browse the impact of their studies to human life: Mustafa Kemal Atatürk, Blaise Pascal, Leonardo Fibonacci, Pythagoras. (TGB8, 2009, p.71B)*
>
> *The first step in using Turkish scientific terms: Atatürk wrote a geometry book, which was designed as a guide in teaching geometry and the teaching of geometry, during the winter months of the years 1936-1937. (TB8, 2009, p.72)*

The controversial point here was the indoctrination of Atatürk as one of the great mathematician. The effort to praise Atatürk by showing him as a mathematician was somehow problematic, because these praises was not a proper tool for endearing Atatürk but an effort to promote nationalist values.

Esen (2007) also interpreted the replacement of Turkish Nationalism with Atatürk's Nationalism as a tool for the legitimization of the "Turkish- Islamist synthesis" of the nationalist-conservative ideology which dominated the social and political life following the 1980 military coup. Esen claimed that 1980 coup was a crucial turning point in the education policies, as it was in many other fields in Turkey. According to her when education was surrounded by extremely nationalist and Islamist ideologies after the coup, the word "national" was placed in front of the name of all courses (for example, national history, national geography, etc.) and the name of Atatürk was used as a legitimate cover of this Turkish- Islamist domination.

Kaplan (2005) and Kancı (2007) also contributed to the detection of Turkish- Islamist turn in the educational settings after the 1980 military coup. Kancı (2007), for instance, argued that the textbooks published in the aftermath of the 1980 military coup continued to include the elements of religious and ethnic nationalisms simultaneously. According to her, while the name of newly-defined 'true version' of nationalism (which was constructed on the Turkish-Islamist Synthesis) was announced as 'Atatürk's nationalism', "the textbooks continued to carry the discourses of Turkish-Islamic synthesis to the masses" (Kancı, 2007, p.122).

Another mathematics specific example of nationalist discourse was the drawing of Turkish Flag.

> *7th grade objective: Draws Turkish Flag according to the specified dimensions which are explained in the Turkish Laws. (EME Program, 2009, p.214)*

Although this objective did not include any direct reference to nationalism, this objective was covered in textbooks and classroom practices generally with reference to bravery, heroism, and supremacy of Turks. Since this topic was covered in the first semester of the education year, I had no classroom observation about it.

The militarist discourse in mathematics education was considered as a supplementary of the nationalist discourse in the context of this study. The militarist discourse in Turkish education was generally studied through the reference to 'military-nation' portrayals in textbooks (Altınay, 2004; Çayır, 2009; Kancı, 2007). Although mathematics education discourse did not include such portrayals, there were some references and praise to soldiers/military in mathematics textbooks. The following sentences were the examples fostering militarism:

> *What can be said about the flying paths of the Turkish Stars during the demonstration flight as shown in the given photograph? (TGB6, 2009, p.19)*
>
> *Have you ever observed how the soldiers walk out the official ceremonies? Their demonstrations which are done in perfect harmony make our people proud and are welcomed with great enthusiasm. What can you say about the ways and directions the soldiers walked during the ceremony? (TB7, 2009, p.34)*
>
> *Throughout history, Turkish women share the responsibilities with men at every stage of life. Turkish women transported combat troops to our soldiers with oxcarts and made a great contribution in the Turkish War of Independence. Examine the oxcart seen in the photo. (TB7, 2009, p.84)*

Although the number of examples in the textbooks was very limited, the context of them could give an indication of how mathematics textbooks addressed militarism. For example, when the sentences '*their demonstrations which are done in perfect harmony make our people proud and welcomed with great enthusiasm'* were examined, it could be seen that it did not have any relation with the context of the mathematics problem. The only reason of placing such sentences in the problems could be to foster militarism and nationalism.

While mathematics education had limited examples of it, the militarist discourses in textbooks were repeatedly presented for the different school subjects, especially for the social science books. For example, Altınay (2004) who focused the textbooks of the National Security courses indicated that the textbooks continued teaching students to be proud members of a military nation and obedient citizens of the Turkish state. Kancı also concluded from the analysis of the textbooks used in Turkey from 1928 to 2000 that the militarist discourse was placed in the textbooks mainly through (i)"treating war as a constant in life and reducing history to a narrative of wars", (ii) "constructing the cult of national security and defense through utilizing the discourse on enemies" and the notion of threat, and (iii) "naturalizing violence together with exaltation of dying and killing in the name of the nation and homeland" (Kancı, 2007**,** p.259).

The reflections of nationalist and militarist discourse into the mathematics classroom practices were not clear enough to help to complete this portrayal of nationalism in mathematics education. There were only two cases which could be considered as the examples of nationalist and militarist expression; one from a textbook question solved in the lesson, and the other from a homework project of the unit 'mathematics in our life'. The following sentences showed these two cases:

> *The landing place of paratroopers, who perform a show in the 30th August Victory Festival, is given below. What is the probability of paratroopers landing to the red-painted area? (TB7, 2009, p.172)*
>
> *Mathematics in Our Lives Unit Project:*
>
> *Dear students, investigate the Turkish historical and cultural productions in your local district and associate them to the historical period they belong. By researching your city, you are expected to realize interaction in the "Turkish culture, art. and aesthetic". (TGB7, 2009, 179B)*

Since these homework and project were not covered in the classroom, there was no dialogue in the classroom related to militarist discourse.

The nationalist discourse observed through the different texts of mathematics education was provided above. The next section would present the teacher's view about this nationalist discourse.

7.2 Nationalist Discourse on Teacher's views

In the pre-interview, I asked the teacher about her views regarding the relationship between nationalism and mathematics education.

> *Nationalism and mathematics … you asked a similar question about the politics and mathematics, as I said there, mathematics is not related too much with these subjects.*

When the question continued to curricular materials, she stated:

> *I may give an example from the content covered in the first semester. At the end of the first semester, we had a topic related to draw a Turkish Flag. We taught students how to draw a proper Turkish Flag, we mentioned about the history of our flag also. Maybe this can be an example of nationalist expression.*

When it was asked to clarify what she thought about such examples, she indicated:

> *Such examples … It could be, it should be in the curriculum. Students should learn to draw their flag properly, it was not only related to drawing, they should also learn how our flag was formed. They should not lose their respect and love for values of this country.*

Teacher's views indicated that she thought that, as similar to her views about the relation between mathematics and politics, mathematics was a school subject free from the nationalism and similar ideologies. The only example she provided about the

nationalist expression was *the topic related to draw a Turkish Flag.* She also claimed that such samples were necessary to let students *respect the values of this country.* Teacher's approach to flag example could be an indication of that she did not consider such nationalist expressions as a reflection of politics. This perception could be the result of 'extensiveness' of the nationalism in our society so that nationalism was not perceived as a 'political standing' but a 'normality'.

On the contrary to the participant teacher's views which supported the integration of nationalist discourse into mathematics education, some researchers highlighted the importance of teachers' roles to remove the nationalist expressions or eliminate the effects of it (Kaya, 2009). Kaya (2009) indicated that teachers have chance to construct a classroom environment which promote tolerance, multiculturalism, and peace instead of intolerance to differences, uniform nationality, and militarization of everyday lives. However, it could be concluded from our interview data that turning this chance into practice requires great effort throughout the teacher education programs since it would be difficult to make teachers to perceive nationalism as 'abnormality'.

As a summary, our analysis displayed that elementary mathematics education was not apart from the nationalist ideology. Firstly, it was observed that nationalist contexts underlining superiority of Turkish nation were widespread and used as a motivation tool. Secondly, the cultural constructs such as *hand-weavings, folk dances, or ceramics* in e*very corner of Anatolia* which are the mutual heritage of e*very ethnic group of Anatolia* was presented as the products of only Turks. The ethnic groups or non-Muslim groups living in Anatolia/Turkey were ignored throughout the textbooks. Thirdly, there was an effort to praise Atatürk by showing him as a mathematician not to endear Atatürk but to promote nationalist values. And lastly, teacher's perception of nationalist expressions was the reflection of perceiving nationalism not as a 'political standing' but a 'normality'.

CHAPTER VIII

CONCLUSION

The current study mainly investigated the relationship between mathematics education and social and political issues, such as neoliberalism, cultural differences, gender discrimination, and nationalism. While investigating the effects of two political views, neoliberalism and nationalism on the mathematics education, it also analyzed the current position of gender stereotyping and class culture in mathematics education. Highlighting the connections between political, cultural, gender, and class issues and mathematics education was not an easy task, however realizing such connections were essential to conduct 'socially responsible mathematics' classes in our schools. By researching mathematics education from a critical perspective, this study aimed to contribute constructing a starting point for socially responsible mathematics education.

Until this point, I tried to provide the theoretical framework of the study, to review the findings of related literature, to explain the research methodology of the study, and to present and discuss the findings with reference to the related literature. I reported the findings of the research in four main sections. In the first section, the effect of neoliberalism into mathematics education was analyzed through revealing profit driven business discourse in mathematics education texts and settings. In the second section, the role of mathematics education in the reproduction of social class inequalities was investigated through highlighting the domination of middle class culture. In the third section, the role of mathematics education in gender discrimination was presented through analyzing gender stereotyped context. In the last section, the effect of nationalism into mathematics education was analyzed through revealing nationalist and militarist discourse in mathematics education texts and settings.

From this point, the findings of the current study were summarized and the conclusions were presented together with implications and recommendations for future researches.

8.1 Profit driven business discourse

The first issue investigated in the study was the direct and indirect effects of neo-liberal education agenda in mathematics education discourse. I argued that this neo-liberal agenda has a tendency to define each individual as an 'economic being' (or homo-economicus) rather than a 'social being' and to educate each individual as a labor market actor whose life and purposes are determined only by free labor market. In line with these arguments, the effects of this neo-liberal agenda were analyzed by means of highlighting profit-driven business discourse in mathematics curriculum, textbooks, classroom practices, and teacher's views.

The first findings emerged from the analysis of business discourse was the usage of 'entrepreneurship' concept in curriculum. The definition of entrepreneurship in the curriculum was composed of abilities which students should have to achieve two main business-related objectives: (i) To present *effective behaviors* in business-like areas; and (ii) To establish *new production and marketization* systems for business. Based on this definition and related literature, I argued that curriculum expected students to use their mathematical abilities and skills for the benefit of business instead of public welfare. The second point underlined in the analysis was the emphasis on being a consumer and specifically being a conscious consumer. After indicating the literature about the neo-liberal portrayal of educated person as market-oriented, consuming, and self-interested, this emphasis of being consumer was considered as the reflection of business discourse. In addition, with reference to definition of entrepreneurship and emphasis on being a consumer, I claimed that curriculum consistently used the same vocabulary for business relationships and social relationships. This usage was interpreted as the indication of a

tendency towards reducing the relationships in social life (such as being a student/citizen) to business relations (such as being a consumer/customer).

The contexts of mathematical problems in textbooks supported the findings derived from the curriculum analysis. In most of the problem contexts related to work life, students were directed to think either (i) as a manager and so to use their mathematical abilities to increase the profit of their company or (ii) as a company worker and so to use their mathematical skills to advertise and sell its newer product. As observed in the problem contexts, brain-storming for *what can be done to increase the sales and the profit* was the main expectation from the students. Moreover, the mathematics problems focusing on companies' profit and loss status were presented as another space for the reflection of profit-driven business discourse.

The numbers of examples were very limited for classroom practices in comparison to textbooks. However, I tried to show that these limited examples were consistent with the business discourse highlighted in the curriculum and textbooks and the context of these examples were far from the lives of participant students. With the light of the information of participant students' lives presented in methodology section, I argued that these students who were coming from lower-class families and mostly living in Gecekondus with limited resources were exposed to deal with unfamiliar problem settings such as 'being an investor'.

The last point presented in the findings of profit-driven business discourse was participant teacher's views about the relationship between political issues and mathematics education. Teacher's views about this relationship were concentrated on the political neutrality of mathematics education. With reference to teacher's comment, I argued that there were two main reasons for seeing mathematics as politically blind: (i) Emphasis on numbers, numerical calculations, that is mathematical parts, of the problems; and (ii) Not considering the possibility of the relationship between mathematics education and political values.

As a conclusion, the analysis of curriculum, textbooks, classroom practices and teacher's view implied that elementary mathematics education oriented students to use their mathematical abilities and skills for the benefit of private corporations instead of public welfare. Since the textbooks and workbooks were the main tools for both students and teachers through the classroom practices, it could be concluded that they were the main agent of this orientation. Although the textbooks emerged as the main agent, the results pointed out that the roots of this orientation were in the curriculum and its emphasize of entrepreneurship. Teacher's unawareness of the politic discourse of mathematics education, on the other hand, closed the only possible door to break the neo-liberal chain covering education contexts.

8.2 Class Culture

The second issue investigated in the study was whether different socio-cultural practices of different social classes were valued in a different way so as to provide a ground for inequalities in the mathematics education or not. Possible findings would also answer the question "Whose lives were presented in mathematics education discourse?"

The analysis started with the curriculum's emphasis on (i) the importance of the relationship between mathematics education and students' real/daily life and (ii) the importance of the solving real-life problems. The vision of the curriculum indicated that mathematics should be taught based on *concrete and finite-life models.* In addition, raising students with the ability of *using mathematics in their daily life* and *appreciating mathematics as an important tool in real life* was defined as the prior objectives of curriculum. I concluded that 'solving real life problems' was placed at the heart of elementary mathematics teaching. However, I also concluded that the questions 'what is real life' and 'whose life will be served as real life' were not satisfactorily answered in the program. I pointed out that this unanswered questions would imply that lower social classes which had a limited/restricted voice in both social life and educational

organizations can face with the risk that their silence will continue in mathematics classrooms.

The analysis of curricular materials showed that this risk turned into reality in the context of the textbooks. The daily life problems in the textbooks were analyzed under three main headings: (i) The problems based on life/activity of whole family; (ii) The problems based on off-class activity of children/students; and (iii) The problems based on life/activity of an adult character. The analysis specified that 'the family' in the problems was the one who *participates different activities such as theater, cinema, and exhibitions at every weekend, visits grandfather, grandmother, or eldest of the family in national holidays, travels different resorts/seaside during the summer vacation,* and *builds/bought a new house or redecorates the existing one.* 'The child' in the problems was the one, who would *go to different courses through the year,* such as *a language course or a musical instrument course, or a sport course, participate different out-door activities with his/her friends such as going to swimming or taking a trip, go to shopping for his/her birthday party, have a computer and a bookcase,* and *s/he would organize with his/her small size classroom either a trip to touristic destination or a campaign to help for a poor school.* Finally, 'the adult' in the problems was the one, who would *care for his health* either by *buying a summer house to escape from stressful pace of everyday life or becoming a member of a sports club,* and *investigate the prices of different technological devices*. In line with these descriptions, I concluded that the 'real life' in mathematics problems was replaced with the lives of middle and upper middle class individuals.

Moreover, observations of classroom practices implied that the questions solved in the classroom were very similar with the textbooks' examples in terms of the class culture they represented. However, detailed description of classroom practices indicated that the focuses of problem solving procedures were mainly centered on the basic calculations and the cultural contexts of the problems were near to vanish. Classroom

observations implied that although the influences of class culture were reduced in the classroom with respect to textbooks, there was still no reference to the lives of participant students in the classroom activities.

Lastly, teacher interviews pointed out that participant teacher's views about class culture issue were parallel to her views of politically neutral mathematics. Although my analysis of textbooks and classroom practices provided counter examples, the teacher believed that different cultural values and practices were respected similarly in schools. In the light of teacher's responses, I also tried to discuss the warnings of cultural capital literature about the possible inequalities that the difference in cultural resources would bring to classroom whether teachers are aware of these inequalities or not. Teacher's answers also underlined two reasons for limited usage of real life examples in the classroom: (i) Her view that the effects of real life examples is generally overestimated and applicable to only successful students; and (ii) Her view that finding a common concept for all students in the classroom is very difficult task.

To conclude, the overall context of elementary mathematics education replaced the 'real life' in mathematics problems with the life of middle and upper middle classes. 'Real life' problems in mathematics textbooks were not prepared to serve appropriately for working class students and they provided middle class students a cultural advantage. The congruence between the life of middle class students and the life presented in mathematical problems could make these problems easier for them in comparison to their lower class peers. When it was considered that middle and upper middle class students already had economic advantage, this cultural advantage would increase the achievement gap between lower classes students and them. It could be claimed that more working class students would be compelled to failure in this unequal cultural and economic conditions. The possible failure was not the only result of this middle class domination for working classes students; they would also have very limited opportunities to comprehend their live conditions through mathematics and so limited

chance to take action against these conditions. While mathematics education had the possibility to make them aware of their lives, this possibility was vanished in the realm of middle class culture.

8.3 Gender

The third issue investigated in the study was gender-stereotyped contexts in mathematics education discourse. It was indicated that educational texts and practices have important roles in the development and internalization of gender roles. As summarized in the related literature, contemporary studies have shown that educational texts have serious deficiencies in terms of gender-stereotyped content. However these studies mainly focused on specific courses such as Turkish and Life Studies, and mathematics were generally not in the scope of these gender-based investigations. One of the aims of this study was to contribute this literature so as to provide a gender-sensitive education environment.

The analysis of the curriculum showed that it did not have positive contribution to gender equality. There were no specific objectives aiming to take precautions towards gender-stereotyped context or direct teachers to provide equally rich education opportunities for female students. It was concluded that mathematics curriculum did not consider gender-stereotyping as a problem to address. I tried to provide some examples from national and international educational programs which encourage gender equality so as to show indicate the need for a gender-sensitive curriculum.

The analysis continued with the investigation of gender-stereotyped contexts in mathematics textbooks. Gender related findings in the textbooks were presented in three main headings: (i) Job Distribution with respect to Gender, (ii) Activities with respect to Gender, and (iii) Mothers and Fathers' roles. The first emerged point was the representation of males in higher numbers and with wider range of job opportunities than females. While male characters were portrayed in 24 different jobs in mathematics

problems, female characters were portrayed basically in traditional and conventional works such as teaching, nursing, or carpet weaving. The second arisen point was the difference in the activities, while women were described as *preparing a meal for her guests, shopping for her birthday party, making a cake for her family, or sewing a skirt for herself,* men were described as *going to work, organizing meetings, building a house, planting a fruit, or fishing for resting.* This description of women activities revealed that mathematics textbooks perceived women as a housewife similar to other content area books. Lastly, the difference in fathers' and mothers' roles implied that textbooks' perception of a family was a patriarchal family. While the father figures were the ones who were responsible for the finance of the household: *They gave allowance to their children, they left legacy to their children, or they bought a present for their children*; mother figures were the ones who were responsible for *dealing with their ill children, preparing meals for their children and shopping with their children.* I concluded that although there was some quantitative remediation in the textbooks, the quality of the gender representations was still highly problematic.

On the contrary to textbooks, classroom practices did not include any sign of difference in the quantity and quality of the gender representations. In addition, observations of classroom practices indicated that there was no significant gender-based difference in terms of attention received from teachers. By presenting related dialogs, I also tried to highlight students' roles in establishing an egalitarian classroom environment.

Teacher's views also supported the findings about classroom practices. Her views presented an indication of sensitivity about gender issue and these views enable her to avoid gender discriminative actions. However, her lack of awareness about gender-stereotyped contexts in curricular materials prevented her to react against these gender-stereotyped contexts.

It could be concluded that, while the representations of girls in mathematics textbooks was increasing, the quality of these representations was still questionable and seemed to

lead gender stereotyping. These findings could be interpreted with the trends in girls' schooling; while the schooling ratios for girls were increasing, girls still preferred mathematics-based higher education branches less. While mathematics education had the power to make girls aware of this inequalities, it, unfortunately, also restricted them with the occupations socially attributed to females. Although the motto of reform movements in mathematics education was 'mathematics for all', when the findings of this study considered, this motto was experienced as 'mathematics for middle class male students.'

8.4 Nationalism

The last issue investigated in the study was nationalist discourse in the elementary mathematics education. With a discussion of different descriptions of nationalism, I tried to focus on nationalism which was defined on the basis of a specific race and emphasized the uniqueness and superiority of this race. The reason of this focus was the argument that such nationalism can be one of the main obstacles against human rights and socially just society.

The first critical point emphasized in the analysis of nationalist discourse was the presentation of Turkish nation as the only nation in Turkey and nonappearance of any comments about multicultural social structure of Turkey in curriculum. In line with the curriculum, the cultural values/constructs of all nations in Turkey were presented as if they only belonged to Turks. For example, the cultural constructs such as *hand-weavings, folk dances, or ceramics* in e*very corner of Anatolia* was presented as the products of only Turks. Based on these examples, I argued that this nationalist context was consistent with the findings of contemporary studies indicating that ethnic groups or non-Muslim groups living in Turkey were ignored throughout the curricular materials.

The second point highlighted in the scope of nationalist discourse was the praises for the Turkish culture, sport, values, location, and production. I claimed that on the contrary to absence of non-Turkish and non-Muslim communities in the mathematics education context, different characteristics of Turks were praised continuously in the mathematics textbooks. Parallel to these praises, the universal values such as *sensuousness, tolerance* and *practicality* were presented as if they belonged only to Turkish people. In addition, the militarist discourse in mathematics textbooks, although there were only three related examples, was considered as a supplementary for the nationalist discourse.

I also tried to underline the usage of "Atatürk's nationalism" as the replacement of "Turkish nationalism" in curriculum and argued that the name of Atatürk and his principles were used to legitimate nationalist arguments in the program and textbooks. I claimed that the presentation of Atatürk as a mathematician in curriculum and textbooks could be considered as the continuum of the nationalist discourse in mathematics education and of the legitimization of this discourse.

Lastly, it was presented that teacher thought that nationalist contexts were necessary to let students *respect the values of this country.* I argued that this perception of nationalist expressions was the reflection of perceiving nationalism not as a 'political standing' but 'normality'.

8.5 Implications

Based on the findings of this study and with reference to current critical mathematics education literature, the next section presented the possible implications for teachers, teacher educators, curriculum developers, textbook writers, and policy makers.

The findings of the study implied that what was included and excluded in the mathematics curriculum had direct reflections in textbooks and classroom practices.

Therefore, any attempt to change for orienting class-, gender-, and culture-sensitive mathematics education should start with transforming mathematics curriculum. Although they were represented in different sections in this study, neo-liberal, nationalist, cultural, and gender-related issues in curriculum should be addressed not separately but collectively. The highly intensive business climate in curriculums should be reconsidered to establish an environment that is based on public goods and needs instead of the goods and needs of private market. The emphasis of the curriculum on the importance of 'real life' and 'problem solving' should be protected; however, there should also be specific directions about integrating the life, culture, and problems of different social classes -especially the lower classes- which had a limited/restricted voice in both social life and educational organizations. In addition, mathematics curriculum should have a strong reference to gender equity and encourage teachers and textbook writers to develop strategies to reduce gender-stereotyped expressions from educational texts and settings. In line with reference to gender equity, mathematics curriculum should underline non-Turkish and non-Muslim groups in Turkey and introduce different problem contexts in which minorities' cultures were represented not as a hostile situation but as richness in our country.

Although transforming curriculum is necessary for transforming curricular materials, such as textbooks and workbooks, it will be not sufficient. Textbooks are one of the bridges between curricula and students (and also teachers). Therefore, there is a need for special consideration/attention to address their deficiencies. The current mathematics textbooks are dominated by corporate culture and business-related discourse, which should be revised to provide greater room for the context that students will use their mathematical skills not for increasing the profits of private corporations but for widening social justice and social equity. Integrating the daily life of working class students into mathematics textbooks and focusing on their social and economic problems in mathematics problems will also be helpful for conducting socially just mathematics. Moreover, the gender-stereotyped contexts in mathematics textbooks,

specifically the limitations in the lives, practices, and occupations of the women represented in textbooks should be eradicated. Furthermore, the usage of cultural values/constructs of all ethnic and religious groups in Turkey as if they only belonged to Sunni – Turks in textbooks should be reformed to eliminate the silence of minorities in mathematics education.

Neither reforming curriculum nor revising textbooks would promise the positive changes in classroom practices. Transforming classroom practices is strongly linked to the change in teachers' perceptions about the relationship between mathematics education and critical issues. Teachers' perception of neoliberal view of education as a 'common sense' and their perception of mathematics education as politically, racially, ethnically, and culturally neutral would be one of the reasons of the reproduction of social inequalities through mathematics education. Therefore, educating in-service and pre-service mathematics teachers about class-, gender- and culture-sensitive mathematics would be a barrier for this reproduction. Although mathematics teacher curricula emphasis teachers' content, pedagogic, and pedagogical content knowledge, there are not sufficient courses or content in other related course addressing the role of mathematics education in social justice. Teacher education programs should cover possible links between mathematics education and cultural diversity, gender equity and social justice. Teacher education students, as future teachers, ideally could be able to use strategies for identifying their students' social and cultural environment to make them cope with their problems.

8.6 Recommendations for Future Researches

Based on the results of this study, there would be some recommendations for further researches.

Although the mathematics curriculum and curricular materials analyzed in this study were from 6^{th}, 7^{th} and 8^{th} grades, the observations of the current study were limited to

the one semester of a 7th grade classroom. This limitation of the study brought some disconnections between the findings from curricular materials and observations from the classroom. Therefore, this study can be repeated by including all elementary school grades, from 6th to 8th grade, to see the a more complete picture in teaching practices.

In addition, students' perception of and their views about profit driven business discourse, the domination of middle class culture, gender stereotyped discourse, and nationalist discourse were not in the scope of this study. However, it is clear that providing information about students' understanding and perception of these issues will be beneficial for how these discourses are internalized by students. For further research, it will be beneficial to investigate how students perceive these critical issues to deepen the discussion about these discourses.

In an attempt to investigate teachers' views about these critical issues, only one teacher was interviewed in the current study. Therefore, the views presented in this study were very limited to portray a comprehensive picture about mathematics teachers' view on these issues. Therefore, to investigate teachers' view about the relationship between mathematics education and critical issues, future researches can be conducted with more participant teachers so as to focus specifically on teachers' views.

The results of this study were limited to the data that were gathered from a public school placed in a lower social class environment. For future researches, examining teaching practices from private schools or schools placed in higher social class environment can provide valuable contributions to investigating the influence of class culture.

Lastly, this study tried to portray current standings of mathematics education in terms of some critical issues. Although I pointed out some alternatives while discussing the findings, a comprehensive answer of what could be done to establish improvements in these issues was not the scope of this study. In the light of critical mathematics

education literature, there can be an attempt to construct a class-, gender-, and culture-sensitive mathematics curriculum. Investigating the possible impacts of such program on students' attitudes towards mathematics and towards these critical issues will greatly enrich the related literature.

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APPENDICES

APPENDIX A

A Sample of Textbook Questions

Yeni açılacak bir eczanenin gelirinin yüksek olabilmesi için neler yapılabileceği ile ilgili araştırma soruları hazırlayınız.	Prepare survey questions for researching what can be done for increasing the profit of a newly opened pharmacy.
Mert eşi ve iki çocuğu her hafta sonu tiyatro, sinema, sergi vb. etkinliklere katılırlar.	Mert, his wife, and their two children attend different activities such as going to theater, cinema, and exhibitions every weekend.
Ali Bey sağlığına dikkat eden bir insandır. Günlük hayatın stres dolu temposundan kaçıp dinlenebileceği bir yayla evi almaya karar verir.	Mr. Ali cares for his health. He decides to buy a summer house to escape from stressful pace of everyday life.
Aşağıdaki paragraf bir okulun 6. sınıf öğrencilerinin kardeş okula yaptıkları kitap yardımını anlatıyor.	The following paragraph describes the help of 6th grade students to a poor school.
Annesi, Ahmet'ten yandaki alışveriş listesinde yer alan ürünleri almasını ister.	His mother wants Ahmet to buy the foods written in the shopping list.
Babalarının verdiği 56 TL'yi iki kardeş Orhan ve Erhan 5/3 oranında paylaşmak istiyorlar.	Orhan and Erhan want to share the 56 TL allowance given by their fathers.
Aysel Hanım misafirleri için yemek hazırlayacaktır.	Aysel will prepare a meal for her guests.
Mehmet Bey günlük aldığı gazete için 55 kr, haftalık aldığı haber dergisi için 2,5 TL ödemektedir.	Mehmet pays 55 kurus for his daily newspaper and 2,5 TL for his weekly journal.
Türk insanı; zevkini, estetiğini, duygusallığını, hoşgörüsünü, pratikliğini üretmiş olduğu el sanatları ile yansıtmaktadır.	Turkish people reflect their taste, aesthetics, sensuality, tolerance, and practicality with the handicrafts they produced.
Resmi törenlerde askerlerin nasıl yürüdüklerine dikkat ettiniz mi? Askerlerin aynı anda ve uyum içinde yaptıkları gösteriler, halkımızı gururlandırmakta ve coşkuyla karşılanmaktadır.	Have you ever observed how the soldiers walk during the official ceremonies? Their demonstrations, which are done in perfect harmony, make our people proud and are welcomed with great enthusiasm.

APPENDIX B

Ders Gözlem Örneği

Süre	Öğretmen	Öğrenci
00.00 – 01.30	Sınıf Defterini ve notlarını kontrol ediyor.	Kendi aralarında konuşuyorlar.
01.30 -	Evet çocuklar, posterlerinizi haftaya derse getiriyorsunuz. Cuma günü ders yok ki! Evet (susturmak için) herkes posterini hazırlasın. Duvara asacak şekilde olacak çocuklar, bana göstereceğiniz şekilde değil, duvara asacak şekilde getireceksiniz, sonra buraya asacağız. Her grubun bir numarası vardı, 2 tane karton alacaksınız, bunlara numaralarınızı yazacaksınız. Herkesin getirdiği şeyleri toplayıp, sonra bunları bir araya getirip, yapıştıracaksınız. O zaman kim ne getirmiş yazarsınız, olabildiği kadar. Herkes grubunu kendi seçti, o yüzden mazeret istemiyorum.	Öğretmenim Cuma günü getirsek? Öğretmenim kimse getirmiyor.
03.03 – 03.20	Notlarına bakıyor.	Kendi aralarında konuşuyorlar.
03.20 -	Evet çocuklar yoklamaya geçiyoruz. Batuhan …	 Burda …
04.10	(Geç gelen Tolga'ya) Tolga bir şey söylemen gerekmiyor mu öğretmenine. Ne söylemen gerekiyor? Tamam, geç yerine, Müesser.	T: Gerekiyor T: Özür dilerim. Bir daha geç kalmıcam öğretmenim. M: Burda.
05.00	(Yoklama bitti, sınıf defterini dolduruyor, notlarına bakıyor.)	Kendi aralarında konuşuyorlar.
06.40	Evet, çocuklar, en son kar-zarar hesaplamalarını görmüştük. Bu ders faiz hesaplamalarını göreceğiz. Başlık at bakalım, Faiz hesapları. (15 saniyelik bir ara, notlarına bakıyor). Faiz problemleri, faiz hesaplamaları diyoruz.	
07.40	Evet, çocuklar faiz hesaplarını belki duymuşsunuzdur, bankadan bir ihtiyacınızı gidermek için kredi aldığınızda, onu faizle geri ödersiniz, ya da, yatırım yapmak istiyorsan eğer, bir miktar para biriktirdin diyelim, bankaya yatırmak istiyorsun,	

	aylık ya da yıllık olabilir, sana faiziyle beraber geri veriyor. Kredi almak istediğinizde, ev kredisi olabilir, araba kredisi olabilir, banka size para veriyor, sonra bunları faiziyle beraber geri veriyoruz. Sonra kredi kartı borçlarına mesela çok fazla faiz biner, faturalarda ödemeyi geciktirirseniz, faiz ödersiniz. O kredi kartı faizlerini baya çoktur, o yüzden bir çok insan zarara uğramıştır yani.	
09.00	Şimdi çocuklar faiz hesaplamalarıyla ilgili formüller yazacağız, o formülü kullanarak hesaplamaları yapıyoruz. (Tahtaya yazarak) Şimdi formülde kullanacağımız harfler var, bunların anlamlarını yazalım sonra formülü yazacağız. A:Anapara, F: faiz, n:zaman, t:faiz oranı. Çocuklar bunu hız problemleriyle falan karıştırmayın, orda t zamandı ama burada faiz oranı. Bakın (yazarak) x=v.t diyorduk burada t neydi, zamandı, ama burada t faiz oranı. Evet yazalım şimdi formülü	Münevver: Öğretmenim t zaman değil miydi?
11.20	Evet çocuklar, (yazarak Yıllık faiz F= A.n.t / 100) yıllık faizde Anaparayı faiz oranı ve yıl sayısıyla çarpıp 100'e bölüyoruz. Aylık faizde, (yazarak Aylık faiz F= A.n.t / 1200) bir yıl içinde 12 ay olduğu için, paydasını 12yle çarpıyoruz. Bankalar faizde yılda 360 gün varmış gibi hesap yapıyorlar o yüzden (yazarak Günlük faiz F= A.n.t / 36000) paydayı 360 la çarpıyoruz. 100'ü 360la çarparsan 36000 eder. Bankalarda yılda 360 gün varmış gibi hesaplanıyor. (Yazmaları için bekliyor, 50 saniye) Bunlar çok da zor değil çocuklar, bunları ezberleyebilirsiniz.	Mete: Öğretmenim o 36000 nerden geldi?
13.20	Şimdi örneklerde daha iyi göreceksiniz, örnek diyelim.	1 dakika hocam..
13.50	75bin TL'nin yıllık %60'dan bir yıllık faizi kaç TL'dir? (25saniye) Hesaplayabilirsiniz. Şimdi %60'dan bir yıllık faize vermiş, o zaman paranın %60'ını bulduğumuz zaman faizi buluyoruz zaten. 2 yıllık deseydi? İkiyle çarpacaktık.	Öğretmenim burada %60'ını mı hesaplayacağız? Merve: O zaman ikiye mi bölecektik?

15.25	Evet kim yapacak, hadi! Şimdi formülümüz var, size yıllık faizi soruyor di mi orada? Şimdi şu formülde A yerine parayı yazacaksın, n yerine zamanı, t yerine faiz oranı, koy yerine hepsini. (Dolaşarak) Para ne kadar, 75bin, zaman ne kadar, 1 yıl, çarpı 1, faiz oranı ne kadar, %60, çarpı 60. 75bin çarpı 1 çarpı 60 bölü 100. Bu kadar. (Sıraları dolaşarak kontrol ediyor)	
16.20	Zehra gel. Sonucu bilmiyorum çocuklar. (Yerinde Zehranın yaptıklarını kontrol ediyor.)	Sonuç ne öğretmenim? (Z: (tahtada) 75000*1*60/100=7500*6=45000)
17.50	%60 faizle 75bin ne kadar faiz getiriyormuş, bize 1 yılda 45bin faiz getiriyormuş, toplam ne kadar para alacağız peki bankadan? 45bin faiz. Biz faizi bulduk, 75binimiz vardı, faizi 45bin, üstüne koyduk, bankadan 120bin alacağız.	Z: 45bin değil mi?
19.00	(Tahtada yapılanları tekrarlıyor) Evet buraya bak, Çocuklar yıllık faiz olduğuna göre, yıllık faiz formülünü kullanmayacak mıyız? Burada A ne Anapara, ne kadar zaman geçmiş, 1 yıl, çarpı t neydi, 60, bölü 100, arkadaşınız sonra sadeleştirme yaptı, 7500 ile 6 yı çarptı, 45bin.	Evet
19.30	Başka şekilde nasıl yapabilirdik? (yazarak) 2.Yol, orantıyla yapabilirdik, şimdi çocuklar %60 faiz demek ne demek? %60 faiz demek, yani şu demek, sen bankaya 100 lira yatırdığında 60 lira o paranın faizi olacak ve sen 160 lira para alacaksın. 100milyon yatırıyorsan 160 milyon oluyor. Doğru mu? (Tahtaya yazarak) Yani sen 100 lira yatırırsan 60 lira faizi olur 160 lira alırsın. Bakın orantı kullanarak yapıcam, 100 TL'lye 60 TL faiz kazanırsan 75000 TL'den kaç bin TL kazanırsın? 100 60 75000 x 100x/100 = 60*75000/100 x=45000 Bu şekilde de yapabiliriz. Eğer alacağımız parayı sorsaydı, 100'de 160 alıyorsak 75binde kaç alırdık diye orantı kurardık. Hangi yol daha kolay? (Yazmaları için bekledi, 25sn)	Evet 1.yol, 2.yol
22.12	Soru, 60000 TL %70'ten 3 aylık faize yatırıldığında	

	bankadan kaç lira çekilir? (60sn) Bu sefer hangi formülü uygulayacağız? (Yapmaları için masasında bekliyor)	Öğr: İkinci.
24.05	Hadi formülde yerine yaz, Hayır, dikkat edin size faizi sormuyor! Hayır, faizi bulacağız formülü kullanarak, sonra anaparaya eklememiz gerekiyor. Hadi.	Öğretmenim 10500 mü? Anaparayı mı soruyor?
25.40	Evet kim yapacak? Gel Ramazan. Evet. Para 60bindi, zaman ne kadarmış, çarpı 3, faiz neydi, çarpı 70, bölü 1200. Aylık faiz formülünü kullanıyoruz. (Ramazanın işlemleri yapmasını bekliyor) 10500 çıktı, tamam, bu faizi, anaparam 60bin, 10500 de faiz geliyor, toplam kaç para alacağız? Topla Ramazan.	 Hocam 70.500 mü? R: 60000*3*70/1200 = 10,500 (Öğretmen söylerken yazıyordu) R: 60000 + 10500 = 70500
29.20	Anlaşıldı mı çocuklar tahtadaki? (Tahtada göstererek) Bakın 60bini 3 aylık faize veriyor, o zaman hangi faiz formülünü kullanıyoruz? Aylık faiz formülünde, anapara ne kadar, 60bin, çarpı zaman ne kadar, 3 ay, yüzdesi ne kadar faizini, yüzde 70, bölü 1200. Sadeleştirmeleri yaparsam en son ne bulduk, 10500, sonra anapara ve faizi topladık, 70500.	Evet Aylık faiz
30.25	Evet soru diyelim. 90000 TL %70'ten 21000 faizi kaç günde getirir? Burada zamanı soruyor? Kaç günde getirir diyor, hangi formülü uygulayacaksın? Evet. Günlük faiz formülünü hemen yazalım.	 Günlük faiz. Hocam günlük faiz di mi?
32.04	Zil çaldı.	

APPENDIX C

Pre-interview Questions:

1. When you consider the mathematics education in general – what is written in curriculum, the examples in textbooks, and the practices in your classroom – how do you assess the political and cultural neutrality of mathematics education?

2. When you consider the elementary mathematics curriculum, do you think that a specific political view or specific cultural values are given particular importance? Can you give examples?

3. When you consider the mathematics textbooks, do you observe any expression which reflects different political or cultural views and values in society? Can you give examples?

4. When you consider the teacher's guidebooks, do you think that a specific political view or specific cultural values are given particular importance? Can you give examples?

5. When you consider your classroom practices, to what extent are these practices influenced by different political or cultural views and values in society or by your political views and values? Can you give examples?

6. When you consider the mathematics education in general – do you think that mathematics education includes sexist contexts? Have you ever encountered with a context that behaves differently to girls and boys? Can you give examples?

7. When you consider the mathematics textbooks, have you ever encountered with an expression which can be differently perceived by girls and boys or which have a possibility to create inequalities between girls and boys? Can you give examples?

8. Do you remember any circumstance in which you behave differently to your male or female students? Can you give examples? Do you think that any teacher in your school behave differently to male and female students? What can be the reason for this difference?

9. How do you assess your male and female students' mathematics achievements? Do you think that either girls or boys are more successful in mathematics?

10. How do you assess your male and female students' attitudes towards mathematics? Do you think that either girls or boys have more positive attitudes towards mathematics?

11. When you consider the mathematics education in general, does mathematics education includes nationalist expressions? Can you give examples?

12. Do you remember any circumstances in which you behave differently to your students? Do you think that your students' sex/socio-economic status/family characteristics influence your behaviors to students? What about the other teachers or administrators?

13. Do you think that mathematics education has a role in raising students' awareness about critical issues, such as social justice, poverty, environmental pollution, or human rights? How? Can you give examples?

14. Have you had any attempt to raise students' awareness about these critical issues in your classroom? How? Can you give examples? How have students reacted to these attempts?

Post-interview Questions:

1. The context of some of the examples in the textbooks seemed far from students' real life, what do you think about this? Can you assess your examples in the classroom in this respect? How were the reactions of students towards the examples that were familiar or unfamiliar with their real life?

2. Do you have students who were very successful or unsuccessful? What are the factors that lie behind this success or failure?

3. It is argued that mathematics achievement is strongly related to students' socio-economic status (SES), what do you think about this relationship? When you consider your successful and unsuccessful students, is there any difference in terms of their SES? Can you assess the achievement differences in your classrooms with respect to fathers' and mothers' education level?

4. Are there parents who have a good and strong communication with you? Can you assess these parents in terms of their SES or other characteristics? How were the attitudes of these parents' children in the classroom? How were your attitudes towards these parents' children?

5. As I have observed, your students have project homework. When you consider the students who gets higher grades from these homework, what are the characteristics of their families? How do their families influence the quality of students' projects?

6. It is argued that students' gender has an influence on their mathematics achievements, what do you think about this relationship? When you consider your successful and unsuccessful students, is there any difference in terms of their gender?

7. I have observed that mathematics textbooks included some sexist expressions. For example, while male characters were portrayed in different occupations, female characters were portrayed generally as being a teacher, how do these portrayals influence students? Did such portrayals draw your attention before? Do you pay attention such details in your classroom practices? How can mathematics teachers show efforts about this issue?

8. I have observed that mathematics textbooks included some nationalist expressions, what do you think about using mathematics education as a tool to raise students' nationalist values?

9. I have observed that mathematics textbooks did not include any reference to critical issues, such as social justice, poverty, environmental pollution, gender discrimination or human rights. What do you think about using mathematics education to raise students' awareness about these issues?

10. I have observed that your classroom practices also did not include any reference to these issues, what are the reasons of this? If you aim to raise such awareness, which issues will be included in your classroom practices?

APPENDIX D

Ön Görüşme soruları

1. Genel olarak matematik eğitimini düşündüğünüzde - müfredatta yazılanlar, ders kitaplarındaki örnekler, sizin derste yaptıklarınız - bu eğitimin politik ve kültürel açılardan tarafsızlığını nasıl değerlendirirsiniz?

2. İlköğretim matematik müfredatının belirli bir politik görüşü veya belirli kültürel değerleri daha ön planda tuttuğunu düşünüyor musunuz? Örnek verebilir misiniz?

3. İlköğretim matematik ders kitaplarında toplumdaki politik ve kültürel değerleri yansıtacak ifadelere rastlıyor musunuz? Örnek verebilir misiniz?

4. Kullandığınız öğretmen kılavuz kitaplarında belirli bir politik görüşün veya belirli kültürel değerlerin daha ön planda tutulduğunu düşünüyor musunuz? Örnek verebilir misiniz?

5. İşlediğiniz dersleri düşündüğünüzde, dersin içeriğinin toplumdaki politik ve kültürel değerlerden ya da sizin kendi dünya görüşünüzden ne derece etkilendiğini düşünüyorsunuz? Nasıl etkileniyor? Örnek verebilir misiniz?

6. Genel olarak matematik eğitimi sizce cinsiyetçi öğeler içeriyor mu? Kız ve erkek öğrencilere farklı davranıldığını hissettiren bir durumla karşılaştınız mı? Örnek verebilir misiniz?

7. Ders kitaplarında kız ve erkek öğrencilerce farklı algılanabilecek veya onlar arasında eşitsizlik yaratacak durumlarla karşılaşıyor musunuz? Örnek verebilir misiniz?

8. Kız ve erkek öğrencilerinize farklı davrandığınız durumlar oluyor mu? Örnek verebilir misiniz? Farklı davranan öğretmenler olduğunu düşünüyor musunuz? Farklı davranışların sebebi ne olabilir?

9. Kız ve erkek öğrencilerinizin matematik başarılarını nasıl değerlendiriyorsunuz? Ortalama matematik başarılarını düşündüğünüzde kızlar erkeklere göre daha başarılı veya başarısız – veya matematiğe daha yatkın – denilebilir mi?

10. Kız ve erkek öğrencilerinizin matematiğe karşı tutumlarını nasıl değerlendiriyorsunuz? Örneğin kızlar erkeklere göre matematiği daha çok seviyor veya sevmiyor denilebilir mi?

11. Genel olarak matematik eğitimini düşündüğünüzde - müfredatta yazılanlar, ders kitaplarındaki örnekler, sizin derste yaptıklarınız - bu eğitimin milliyetçi öğeler içerdiğini düşünüyor musunuz? Örnek verebilir misiniz?

12. Öğrencilere farklı davrandığınız/farklı tepkiler verdiğiniz oluyor mu? Öğrencilerin cinsiyetleri / sosyo-ekonomik statüleri / ailelerinin özelliklerinin sizin onlara karşı tutumunuzu etkilediğini düşünür müsünüz? Diğer öğretmenler veya idarecileriniz için bu durum nasıl?

13. Matematik eğitimi öğrencilerin toplumsal adalet, yoksulluk, çevre kirliliği, insan hakları gibi toplumsal konular veya sorunlar hakkında bilinçlendirilmesinde rol oynayabilir mi? Nasıl? Örnek verebilir misiniz?

14. Siz kendi derslerinizde öğrencilerin bu gibi sorunlara daha duyarlı olmaları için çaba gösteriyor musunuz? Nasıl? Örnek verebilir misiniz? Öğrencilerin bu çabalarınıza karşı tavırları nasıl oluyor?

Son Görüşme Soruları

1. Ders kitaplarındaki bazı örneklerdeki durumlar çocukların yaşantısından oldukça uzak görünüyordu (Örneğin bir problemde otobüs firmasında yönetici olan bir kişinin reklam harcamalarına ayırması gereken bütçe üzerinden sorular soruluyordu) Siz bu konuda ne düşünüyorsunuz? Sınıfta çözdüğünüz problemleri bu açıdan değerlendirebilir misiniz? Öğrencilerin hayatlarının içinden veya dışından sorulan sorulara sizce öğrencilerin tutumu / tepkisi nasıl oluyor?

2. Çok başarılı veya çok başarısız bulduğunuz öğrencileriniz var mı? Bu başarı ve başarısızlıklarını ne tip etkenlere bağlıyorsunuz?

3. Matematik başarısı ile öğrencilerin sosyo-ekonomik statüleri (SES) arasında kayda değer bir ilişki olduğu vurgulanıyor, bu konuda siz ne düşünüyorsunuz? Sınıftaki başarılı ve başarısız öğrencilerinizi değerlendirdiğinizde, SES'lerine göre bir farklılık var mı? Sınıfınızdaki başarı farklılıklarını anne-babanın eğitim düzeyine göre değerlendirebilir misiniz?

4. Sürekli sizinle iletişimde olan ve iyi bir iletişim kurduğunuzu düşündüğünüz velileriniz var mı? Bu velileri SES açısından veya başka özellikleri açısından değerlendirebilir misiniz? Sizinle sürekli görüşen velilerin çocuklarının derse karşı tutumu nasıl oluyor? Sizin o öğrencilere karşı tutumunuz nasıl etkileniyor?

5. Derslerinizde gözlemlediğim kadarıyla öğrencilerin proje ödevleri oluyor, bu ödevlerde yüksek performans gösteren öğrencileri ailelerinin durumlarına göre değerlendirdiğinizde nasıl bir tablo ortaya çıkar? Ailelerin katkısı nasıl oluyor bu ödevlere?

6. Matematik başarısının öğrencilerin cinsiyetlerine göre farklılık gösterdiği iddia ediliyor bu konuda siz ne düşünüyorsunuz? Sınıftaki başarılı ve başarısız öğrencilerinizi değerlendirdiğinizde, cinsiyetlerine göre bir farklılık gözlemliyor musunuz?

7. Yaptığım analizlerde ders kitaplarında cinsiyetçi öğelerle karşılaştığımı söyleyebilirim. Örneğin ders kitaplarındaki örneklerde erkekler farklı mesleki roller üstlenirken kadınlar genelde öğretmen olarak resmedilmiş, sizce bu tiplemelerin kullanılması öğrencileri nasıl etkiler? Bu tip vurgular daha önce dikkatinizi çekti mi? Siz dersinizde bu tip ayrıntılara dikkat ediyor musunuz? Matematik öğretmenleri bu konuda nasıl bir çaba gösterebilir?

8. Yaptığım analizlerde ders kitaplarında milliyetçi öğelerle karşılaştığımı söyleyebilirim, sizce matematik eğitimi öğrencilerin bu tip fikirleri geliştirmesi için bir araç olarak kullanılabilir mi?

9. Yaptığım analizlerde ders kitaplarında cinsiyet ayrımcılığı, yoksulluk, çevre kirliliği, insan hakları gibi toplumsal konuların pek fazla yer almadığı sonucuna vardım. Sizce matematik eğitimi öğrencilerin bu konular hakkında bilinçlendirilmesinde rol oynayabilir mi? Nasıl?

10. Gözlemlediğim derslerinizde sizin bu konulara çok değinmediğinizi gördüm, bunun özel bir sebebi var mı? Siz matematik dersinde böyle bir bilinç geliştirmeyi amaçlasanız, hangi konuları dersinize dâhil ederdiniz?

APPENDIX E

TEZ FOTOKOPİSİ İZİN FORMU

ENSTİTÜ

Fen Bilimleri Enstitüsü ☐

Sosyal Bilimler Enstitüsü ☐

Uygulamalı Matematik Enstitüsü ☐

Enformatik Enstitüsü ☐

Deniz Bilimleri Enstitüsü ☐

YAZARIN

Soyadı :.....
Adı :.....
Bölümü :.....

TEZİN ADI (İngilizce) : …….....
.....

TEZİN TÜRÜ : Yüksek Lisans ☐ Doktora ☐

1. Tezimin tamamı dünya çapında erişime açılsın ve kaynak gösterilmek şartıyla tezimin bir kısmı veya tamamının fotokopisi alınsın. ☐
2. Tezimin tamamı yalnızca Orta Doğu Teknik Üniversitesi kullanıcılarının erişimine açılsın. (Bu seçenekle tezinizin fotokopisi ya da elektronik kopyası Kütüphane aracılığı ile ODTÜ dışına dağıtılmayacaktır.) ☐
3. Tezim bir (1) yıl süreyle erişime kapalı olsun. (Bu seçenekle tezinizin fotokopisi ya da elektronik kopyası Kütüphane aracılığı ile ODTÜ dışına dağıtılmayacaktır.) ☐

Yazarın imzası ..... Tarih .....

CURRICULUM VITAE

OĞUZHAN DOĞAN

Mehtap Mahallesi, Okullar Caddesi	Tel: (312) 364 9260
Girgin Apartmanı, No: 4/13	Cell: (505) 580 2657
Saimekadın, Mamak, ANKARA	E-mail: oguzhand@gmail.com

EDUCATION

Ph.D. Elementary Education, Department of Elementary Education, Middle East Technical University, Ankara, Turkey. Doctoral dissertation: *Upper Elementary Mathematics Curriculum in Turkey: A Critical Discourse Analysis*. (June, 2012)

Master of Science. Elementary Science and Mathematics Education, Department of Elementary Education, Middle East Technical University, Ankara, Turkey. Major: Mathematics Education. Master's thesis: *A Study on Pattern of 6th grade Elementary Mathematics Lesson*. December, 2006.

Bachelor of Science. Elementary Mathematics Education, Department of Elementary Education, Middle East Technical University, Ankara, Turkey. June, 2003.

ACADEMIC POSITIONS

01/2004 - 09/2010	Research /Teaching Assistant, Middle East Technical University Department of Elementary Education

TEACHING CAREER

09/2003 - 01/2004	Mathematics Teacher, Pazarköy Elementary School, BOLU

PUBLICATIONS

Articles published in International Journals

Haser, Ç. & **Doğan, O.** (2012). Preservice mathematics teachers' belief systems. *Journal of Education for Teaching: International research and pedagogy, 38:3, 261-274*

Articles published in National Journals

Işıksal, M., Kurt, G.**, Doğan, O.,** Çakıroğlu, E.,(2007). İlköğretim Matematik Öğretmen Adaylarının Epistemolojik Kavramlamaları: Üniversite ve Sınıf Düzeyinin Etkisi. *İlköğretim Online, İlköğretim Online 6*(2), 313-321, [Online]: http://ilkogretim-online.org.tr.

Presentations at the International Professional Meetings

Dogan, O. & Haser, C. (2010). Tracing Critical Issues in Elementary Mathematics in Turkey: An Investigation of Elementary Mathematics Curriculum and Textbooks. *Paper presented at the European Conference on Educational Research (ECER) 2010*, Helsinki, Finland, August 23-27, 2010

Haser, C. & **Dogan, O.** (2009). Understanding the Impact of an Initial Methods Course on Preservice Teachers' Teaching Beliefs. *Paper presented at the European Conference on Educational Research (ECER) 2009*, Vienna, Austria, September25-26, 2009.

Dogan, O. & Haser, C. (2009). The Effects of Grade Level on Prospective Elementary Mathematics Teachers' Mathematics Related Beliefs. *Paper presented at the European Conference on Educational Research (ECER) 2009*, Vienna, Austria, September25-26, 2009.

Dogan, O. & Çakıroğlu, E. (2009). A Study of Elementary Mathematics Lessons in Turkey. *Paper presented at the European Conference on Educational Research*

(ECER) 2009, Vienna, Austria, September25-26, 2009.

Kurt, G., Işıksal, M., **Doğan, O.**, Cakiroglu, E. (2006). Assessing Pre-Service Teachers Epistemological Conceptions of Mathematics. *Poster presented at 3rd International Conference on the Teaching of Mathematics at the Undergraduate Level, Istanbul, Turkey, June 30- July 5.*

Presentations at the National Professional Meetings

Dogan, O., Cakiroglu, E. & Haser, C. (2008). 6. Sınıf matematik derslerindeki öğretim uygulamalarının yapısı üzerine bir çalısma. *Proceedings of the 8th National Congress on Science and Mathematics Teaching*, 282, Bolu, Turkey.

Doğan, O., Işıksal, M., Kurt, G., Çakıroğlu, E. (2006). Öğretmen Adaylarının Matematiğe Yönelik Epistemolojik Kavramlamaları. *Proceedings of the 7th National Congress on Science and Mathematics Teaching*, Ankara.

National Books

Aksu, M., Ertepınar, H., Bulut, S., Olkun, S., Çakıroğlu, E., Çakıroğlu, J., Kılıç, G.B., Sungur, S., Toluk, Z., Buldu, N., **Doğan, O.,** Özkan, Ş., Yıldırım, H. H. (2005). *Matematik, Fen ve Ben, 1, 2, 3.* Eğitim Gönüllüleri Vakfı Yayınları: İstanbul.

RESEARCH EXPERIENCE

Team Member

METU Research Fund 07-03-2010-00-13. *Critical Issues in Elementary Mathematics Education: Curriculum Documents, Classroom Practices, and Teachers' Views*. (2009-2010)

METU Research Fund 05-06-2009-05. *An Investigation of Young Faculty Members' Ideas about Teaching at the University and the Perspectives of their Students.* (2009-2010)

METU Research Fund 07-03-2010-00-09. *Development of a Mathematics Related Beliefs Scale for Preservice Teachers*. (2006-2007)

EXPERIENCE

Teaching Assistant for the following undergraduate courses:

ELE 132 – School Experience I

ELE 224 – Instructional Planning, Measurement and Assessment

ELE 317 – Instructional Development and Media in Mathematics Education

ELE 336 – Methods of Mathematics and Science Teaching

ELE 420 – Practice Teaching in Elementary Education

ELE 437 – School Experience II

ELE 448 – Mathematics Textbooks in Elementary Education

TURKISH SUMMARY

TÜRKİYE'DE İLKÖĞRETİM MATEMATİK EĞİTİM PROGRAMI: ELEŞTİREL SÖYLEM ANALİZİ

1. Giriş

Son yıllarda ülkemizdeki matematik eğitimcileri ve eğitim araştırmacıları tarafından dikkatle takip edilen konulardan biri ilköğretim öğrencilerinin ulusal ve uluslararası sınavlarda gösterdikleri düşük matematik başarısıdır. Bu konuda yapılan çalışmalar ve tartışmalar genel olarak bu düşük başarının nedenleri ve öğrencilerin daha başarılı olabilmeleri için yapılabilecek olası düzenlemeler üzerinde yoğunlaşmaktadır. Ailelerin sosyoekonomik durumları ve eğitim harcamalarının düşüklüğü öğrencilerin kaliteli bir eğitime ulaşmadaki temel engellerden biri olarak algılanmakta ve bu düşük performansın sebebi olarak gösterilmektedir.

Diğer yandan, öğrencilerin sınıfsal, kültürel ve etnik farklılıklarının bu sınav sonuçlarına olan etkileri eğitimciler ve araştırmacılar arasında yeterli ilgiyi görmemektedir. Fakat sınıfsal, kültürel ve etnik farklılıkların öğrencilerin matematik öğrenmesine olan etkilerini sorgulamak araştırmacıların Türkiye'deki matematik eğitiminin yapısı üzerine ilham verici sorular sormasına yol açabilir; örneğin, ülkemizdeki matematik eğitimi içeriği ve sunumuyla toplumun farklı kesimlerine eşit bir şekilde hitap edebilmekte midir?

Öğrencilerin sınıfsal, kültürel, dilsel, dinsel, etnik ve cinsiyet farklılıklarının eğitim süreçlerine ve sonuçlarına etkileri uluslararası eğitim camiasında oldukça ilgi görse de ülkemizde bu alanda yapılan bilimsel çalışmalar ve tartışmalar son derece kısıtlıdır. Araştırmacılar yıllardır kamusal eğitim sisteminin her öğrenci için eşit sonuçlar üretmediğinin altını çizmektedirler. Sınıfsal, kültürel, dilsel, dinsel, etnik ve cinsiyet farklılıklarının öğrencilerin akademik başarılarını, mezuniyet oranlarını ve

yükseköğrenime devam edebilme şanslarını anlamlı ölçüde etkilediği belirtilmektedir (Gregson, 2007). Altı çizilen bu başarı farklılıkları, eleştirel eğitim araştırmacılarını okullarda, eğitim programlarında, ders kitaplarında ve sınıf-içi etkinliklerde farklı sosyal sınıfların, kültürlerin, etnik grupların ve cinsiyetlerin ne ölçüde yer aldığı ve temsil edildiği konusunda düşünmeye yöneltmiştir. Bu farklılıkların eğitim programları ve süreçlerinde anlamlı şekilde yer bulamaması, bu farklılıklara sahip öğrencilerin kaliteli bir eğitim yaşantısına sahip olamamasının önemli sebeplerinden biri olarak gösterilmektedir (Gutstein, 2006).

Yukarıda belirtilen argümanların ışığında ve matematik eğitiminin bu tartışmalarda yeterince yer bulamadığı düşüncesinden hareketle bu çalışmanın amacı, Türkiye'de ilköğretim matematik eğitiminde sınıfsal, kültürel, etnik ve cinsiyet farklılıklarının nasıl ve ne ölçüde karşılık bulduğunun araştırılması olarak belirlenmiştir. Bu amaca paralel olarak bu çalışma, matematik eğitiminin sosyal ve politik konularla olan ilişkisini anlamaya yönelik çabalara katkı sunmayı hedeflemektedir.

Matematik eğitiminin sosyal ve politik konularla olan ilişkisinin ne ifade ettiğini belirginleştirmek adına günümüzde matematik eğitiminin nasıl algılandığından bahsetmek yararlı olacaktır. Son yıllardaki anlayış değişiklikleriyle birlikte, matematik eğitimi artık sadece belli algoritmaların öğretilmesi ve bu algoritmalar ile ilgili alıştırma yapılmasından oluşmamaktadır. Türkiye'deki ve dünyadaki matematik eğitimi alanındaki reform hareketleri günlük yaşam problemlerine en az bu algoritmalar kadar vurgu yapmaktadır. Günlük yaşam problemlerine artan bir ilgi olsa da yeni matematik müfredatında ve matematik sınıflarında sosyal adalet, demokrasi, eşitlik, toplumsal ve kültürel farklılıklar gibi öğrencilerin hayatlarına önemli etkileri olan kritik konulara hala yeterince ilgi gösterilmemektedir. Bu anlamda bu çalışma matematik eğitiminin neo-liberal eğitim politikaları, sınıfsal ve kültürel farklılıklar, cinsiyet ayrımcılığı ve milliyetçilik ile olan ilişkisine odaklanmaktadır. İlköğretim matematik eğitim programı,

ders kitapları, sınıflardaki uygulamalar ve öğretmen görüşleri bu ilişkinin araştırılacağı temel veri kaynağı alanları olacaktır.

Matematik eğitimi genellikle sosyal, sınıfsal, kültürel ve politik konularla birlikte konumlandırılmadığı için, matematik eğitiminin bu konularla olan ilişkisini anlamak adına eleştirel pedagoji ve eleştirel matematik eğitimini kısaca tanımlamak faydalı olacaktır. Çalışma sorularını belirtmeden önce "Eleştirel Matematik" (Frankenstein, 2006; Skovsmose, 1994) ve "Toplumsal Adalet için Matematik Öğretimi" (Gutstein, 2003; Gutstein ve Peterson, 2006) kavramlarını açıklamak bu çalışmanın altında yatan motivasyonu açığa çıkaracaktır.

1.1 Eleştirel Pedagoji: Daha eşit ve adil bir dünya için umut

Eleştirel pedagojinin kökeni Antonio Gramsci'nin ve Frankfurt Okulu'nun üyeleri olan Marx Horkheimer, Theodor Adorno ve Herbert Marcuse gibi eleştirel sosyologların çalışmalarına dayanmaktadır (Darder, Baltodano ve Torres, 2003; Skovsmose, 1994). Toplumsal eşitsizlikleri yeniden üreten kurumları ve bu eşitsizlikleri ortadan kaldırma olanaklarını araştırma ve yorumlama üzerine disiplinler arası çalışmalar yapan Frankfurt Okulu sosyologları eğitime ikili bir rol biçmişlerdir; toplumsal eşitsizliklerin yeniden üretiminde dolaylı olarak rol oynayan eğitim aynı zamanda bu eşitsizlikler hakkında farkındalık kazandırmada da rol alabilir. Fakat bu ikinci rolü başarabilmesi için eleştiri ve eğitimin bir arada düşünülmesi gerekir (Adorno, 1997).

Eleştirel pedagoji, hâlihazırda okulların/eğitimin mevcut toplumsal eşitsizlikleri yeniden üretmeye hizmet ettiklerini fakat buna rağmen yöntem ve içerik olarak değiştirildiğinde eğitimin bu eşitsizlikleri ortadan kaldırma sürecine yardım edebileceğini iddia etmektedir (Blackledge ve Hunt, 1985; Freire, 1991). Eleştirel pedagoji, öğretmenlerin, öğrenciler için değil, öğrencilerle birlikte daha adil ve eşitlikçi bir dünya için alternatif bir eğitim sistemi yaratma çabasıdır. Bunun için de öğrencilerin; (1) toplumun adaletsiz ve baskıcı sosyal ve ekonomik yapısı ve bu yapının kendi hayatları üzerindeki etkileri

hakkında bilinçlenmesi ve (2) bu adaletsizlikleri ve baskıcı yapıyı değiştirmek için harekete geçmeleri gerekir. Bu bilinçlenme ve harekete geçme süreci "Praksis" olarak adlandırılır (Freire, 1991). Eğitim, mutlak doğruların her şeyi bilen öğretmenler tarafından öğrencilere aktarıldığı bir süreç olarak değil, praksis olarak kurgulanmalıdır.

Paulo Freire'in (1991) "Ezilenlerin Pedagojisi" adlı kitabı eleştirel pedagojinin olgunlaşması noktasındaki en önemli katkılardan biridir. Freire bu kitabında Brezilya'nın okuma yazma oranının oldukça düşük olduğu bir yerli kasabasında okur-yazarlık eğitimine dair çalışmalarını ve çalışma sonunda ulaştığı bulguları ve yorumlarını aktarmaktadır. Freire öğrencilere okuma yazma öğretme sürecinde, onların kendi yaşamlarına dair görsel materyalleri inceleyerek, hayattaki konumlarına dair eleştirel düşüncelerini paylaştıkları bir sınıf ortamı yaratmaya çalışmıştır.

1.2 Eleştirel Pedagoji ve Matematik Eğitimi

Eleştirel matematik eğitimi (Frankenstein, 2005; Skovsmose, 1994) veya toplumsal adalet için matematik eğitimi (Gutstein, 2003; Gutstein ve Peterson, 2006) son yıllarda ortaya çıkmakta olan ve matematik derslerinin odağına toplumsal adaletsizlikler, cinsiyet ve ırk ayrımcılığı, çevresel ve kültürel sorunlar gibi toplumsal hayatı ilgilendiren konuları koyan bir eğitim yaklaşımıdır. Eleştirel matematik eğitimi, öğrencileri bu konular hakkında bilinçlenmeye ve harekete geçmeye motive eden bir bakış açısıdır. Bu bakış açısının kökleri eleştirel pedagojiden beslenmektedir.

Eleştirel matematik eğitimi, eleştirel pedagojinin teorik ve pratik çıkarımlarını matematik derslerine uyarlayarak öğrencilerin kendi yaşantılarındaki ve toplumsal hayattaki adaletsizlikleri ve sorunlu noktaları incelemelerine ve daha adil bir toplumsal hayat için düzenlemeler önermesine yardımcı olmayı amaçlar (Gutstein, 2003). Eleştirel matematik alan yazını önümüze iki temel varsayım sunmaktadır:

1. Matematik eğitimi (eğitim programı, ders kitapları ve ders işlenişleri) politikadan bağımsız bir okul disiplini değildir, aksine toplumdaki mevcut hegemonyaya ve baskın politik ve kültürel görüşlere oldukça bağlı bir disiplindir.

2. Matematik eğitimi sadece belli formülleri ezberleme, belli algoritmaları tekrar etme ve bazı matematik sorularını çözmekten ibaret değildir, aksine toplumsal sorunları anlama ve çözmeye yardımcı olabilecek süreçleri de içerir.

Eleştirel pedagoji ve eleştirel matematik eğitimi hızla büyüyen bir alan yazınına sahip olsa da ülkemizde bu konuda yapılan çalışmalar oldukça kısıtlıdır. Türkiye'de bu alandaki açığı kapatmaya yardımcı olmak ve öğretmenlerin ve araştırmacıların eleştirel matematik eğitimine ilgilerini arttırmayı hedefleyen bu çalışmanın araştırma soruları aşağıdaki bölümde verilmektedir.

1.3 Çalışmanın Amacı ve Araştırma Soruları

Bu çalışmanın genel amacı yukarıda sunulan varsayımlardan ilkini, 'matematik eğitimi toplumdaki mevcut hegemonyaya ve baskın politik ve kültürel görüşlere oldukça bağlı bir disiplindir' varsayımını, Türkiye'deki ilköğretim matematik eğitimi açısından sınamaktır. Daha spesifik olarak, bu çalışma neo-liberalizmin, sınıfsal ve kültürel farklılıkların, cinsiyet ayrımcılığının ve milliyetçiliğin ilköğretim matematik eğitimindeki yansımalarını araştırmayı hedeflemektedir. Bu hedef doğrultusunda aşağıdaki araştırma soruları oluşturulmuş ve ilköğretim matematik eğitim programı, ders kitapları, ders işlenişi ve öğretmen görüşleri bu soruları cevaplamak adına incelenmiştir.

a) Türkiye'deki ilköğretim matematik eğitim programı, ders kitapları ve ders işlenişleri, ülkemizdeki politik, sınıfsal, kültürel ve ataerkil değer ve görüşlerden hangi ölçüde bağımsızdır?

i) Neo-liberal eğitim politikaları ilköğretim matematik eğitim programı, ders kitapları ve ders işlenişlerine nasıl ve ne ölçüde yansımaktadır?

ii) Farklı sosyal sınıfların kültürel yaşantıları ve değerleri ilköğretim matematik eğitim programı, ders kitapları ve ders işlenişlerine nasıl ve ne ölçüde yansımaktadır?

iii) Cinsiyetçilik ve ataerkil değerler ilköğretim matematik eğitim programı, ders kitapları ve ders işlenişlerine nasıl ve ne ölçüde yansımaktadır?

iv) Milliyetçilik ve etnik farklılıklar ilköğretim matematik eğitim programı, ders kitapları ve ders işlenişlerine nasıl ve ne ölçüde yansımaktadır?

b) İlköğretim matematik öğretmenlerinin, matematik ve politik, sınıfsal, kültürel ve ataerkil değerler ve görüşlerin ilişkisi üzerine düşünceleri nelerdir?

1.4. Çalışmanın Önemi

Toplumsal alandaki baskın görüşlerin ve sorunlu bakış açılarının (örn. cinsiyet ayrımcılığı) eğitim sürecinde nasıl yeniden üretildiği önemli bir çalışma alanı olmakla birlikte, bu alanda yapılan çalışmalar genellikle hayat bilgisi, sosyal bilgiler ve tarih gibi derslerle sınırlı kalmaktadır. Fakat son yıllarda matematik eğitiminin de bu yeniden üretimde oynadığı rol ve olası düzenlemelerle bu sorunlu bakış açılarını değiştirmede oynayabileceği rol tartışılmaya başlanmıştır. Bu çalışma, varolan bu tartışmalara katkı sunmayı amaçlamaktadır.

Bununla birlikte matematik öğretiminde tespit edilecek olası sorunlu durumlar ve öğretmenlerin görüşleri ışığında geliştirilecek öneriler, matematik eğitiminin yeniden düzenlenmesi sürecinde toplumsal sorunlara karşı duyarlılığı geliştirebilecek bir matematik öğretimi için önemli bilgiler sunacaktır.

2. Yöntem

Yukarıda belirtilen araştırma sorularının incelenmesi için kullanılan yöntem nitel araştırma metotlarından biri olan eleştirel söylem analizidir. Eleştirel söylem analizi (ESA) temel olarak metin, konuşma ve diğer iletişimsel içeriklerdeki farklı sosyal anlamların saptanması, tanımlanması ve yorumlanmasına odaklanan bir söylem analizi kategorisidir (Fairclough, 1992, 1995; van Dijk, 2001). Eleştirel söylem analizi genel olarak toplumsal eşitsizlikleri anlamaya, resmetmeye ve sonrasında ortadan kaldırmaya yönelik bir araştırma yöntemidir. Bu yöntemin uygulayıcıları metin, konuşma, sözel etkileşim ve diğer iletişimsel içeriklerin nasıl oluşturuldukları, dağıtıldıkları ve tüketildiklerine ve bunların mevcut toplumsal eşitsizliklerin yeniden üretiminde nasıl rol oynadıklarına dair bilimsel bilgi üretmeyi amaçlamaktadır (van Dijk, 1993, 2001).

Dil ve iletişim, eleştirel söylem analizi tarafından toplumu oluşturan ve değiştiren bir sosyal etkinlik olarak algılanır (Fairclough, 1995). ESA'nın temel noktalarından biri tüm söylemlerin (discourses) ve özellikle eğitim programları gibi kurumsal söylemlerin 'sosyal, kültürel ve politik olarak bağımlı/bağıntılı' olduğunu iddia etmesidir. ESA'ya göre 'iletişim' ve 'bilgi' hiçbir zaman objektif değildir; tarafsız (nötr) bilgi diye bir şey yoktur. Her bilgi birileri tarafından üretildiği, dağıtıldığı ve tüketildiği için sübjektif ve ideolojik bir anlam içerir ve eleştirel söylem analizi bu anlamı gün yüzüne çıkarmak ve açıklamak için önemli bir bilimsel yöntemdir (van Dijk, 2001).

Güç ilişkilerinin ve toplumsal eşitsizliklerin metinler ve iletişimsel içerikler tarafından nasıl üretildiği, korunduğu ve meşrulaştırıldığı ESA'nın temel ilgi alanı olduğu için (Locke, 2004), bu çalışmada araştırma yöntemi olarak ESA kullanılmıştır.

2.1 Veri Kaynakları

Bu çalışma Ankara'nın merkez bölgelerinden Seyranbağları'ndaki Safran İlköğretim Okulunda (takma ad) 2009-2010 öğretim yılının 2. döneminde gerçekleştirilmiştir. Çalışmada dört temel veri kaynağı bulunmaktadır: (1) İlköğretim matematik öğretim

programı (6., 7. ve 8. sınıflar); (2) ders kitapları, çalışma kitapları ve öğretmen kılavuz kitaplarından oluşan program belgeleri (dokümanları) (6., 7. ve 8. sınıflar); (3) konu anlatımını, verilen örnekleri, sorulan soruları, öğrencilerin tartışmalarını, günlük ödevleri, proje ödevlerini içeren matematik sınıflarındaki uygulamalar ve iletişim (7. sınıf, 2. yarıyıl) ve (4) katılımcı öğretmenle yapılan birebir derinlemesine görüşmeler.

Bu çalışmada analiz edilen matematik öğretim programı ve ders kitapları, çalışma kitapları ve öğretmen kılavuz kitaplarından oluşan program dokümanları Safran İlköğretim Okulunda 2009-2010 yılında ücretsiz olarak dağıtılan ve Milli Eğitim Bakanlığı tarafından onaylanan 2009 yılı basımı kitaplardır.

2.1.1 Katılımcı Okul, Sınıf ve Öğretmen

Bu çalışmanın yürütüldüğü Safran İlköğretim Okulu (İÖO), 1963 yılında Ankara'nın Seyranbağları semtinde kurulmuştur. Okul şehir merkezine yakın olmakla birlikte fazla büyük değildir. İki binadan oluşan okulda 296 kız ve 311 erkek olmak üzere toplam 607 öğrenci eğitim görmektedir. Okulun ortalama sınıf mevcudu 30 ve toplam öğretmen sayısı 40'dır. Safran İÖO şehir merkezine yakın olsa da bulunduğu yer itibariyle Gecekonduların yoğun olduğu ve alt-orta ve orta sınıf ailelerin yaşadığı bir yerleşim yerinde bulunmaktadır. Okulun İlçe Milli Eğitim Müdürlüğü için hazırlamış olduğu Stratejik Planlama Raporuna göre öğrenci ailelerinin önemli bir kısmı Ankara'nın kırsal kesimlerinden buraya göç etmiş ve genellikle Gecekondularda yaşamlarını sürdüren ailelerdir. Öğrencilerin babaları genellikle asgari ücretle ve güvencesiz işlerde çalışırken, anneler genellikle ev hanımıdır. Aynı bölgede yaşayan orta ve üst-orta sınıf aileler çocukları için Seyranbağları'ndaki farklı bir okulu tercih etmektedirler.

Bu çalışma kapsamında gözlem yapılan sınıf Safran İÖO 7-A sınıfıdır. Bu sınıfta araştırma gerçekleştirildiği sırada 15 kız ve 13 erkek olmak üzere toplam 28 öğrenci bulunmaktaydı. Sınıftaki öğrencilerin babalarından sadece 4 tanesi devlet memuru olarak çalışmakta, diğer babalar servis şoförü, inşaat işçisi ve temizlik elemanı olarak güvencesiz işlerde asgari ücrete çalışmaktaydılar. Ayrıca öğrencilerden sadece 3'ünün

annesi sözleşmeli personel olarak çalışmakta idi, diğer anneler ise ev hanımı idiler. 7-A sınıfı öğrencileri boş zamanlarını televizyon izleyerek veya internet kafelerde geçirdiklerini belirttiler. Öğrencilerden sadece 4'ü aileleriyle birlikte sinema veya tiyatroya gittiklerini belirtirken, diğerleri birlikte sadece televizyon izlediklerini belirttiler.

Çalışmaya katılan 7-A sınıfı matematik öğretmeni, Selin öğretmen (takma ad), 30 yaşında ve 3 yıldır bu okulda görev yapmaktaydı. Selin öğretmen, 2002 yılında üniversiteden mezun olmuş ve 8 yıldır öğretmenlik yapmaktaydı.

2.2 Veri Toplama

Veri toplama süreçlerini anlatmadan önce belirtilen araştırma soruları için hangi veri kaynaklarının kullanıldığını açıklamak faydalı olacaktır. Aşağıdaki tabloda hangi araştırma soruları için hangi veri kaynaklarının kullanıldığı özetlenmektedir.

Tablo 1. Araştırma soruları ve veri kaynakları

Araştırma Soruları	Veri Kaynakları
Türkiye'deki ilköğretim matematik programı ve ders kitapları ülkemizdeki politik, sınıfsal, kültürel ve ataerkil değer ve görüşlerden hangi ölçüde bağımsızdır?	İlköğretim matematik öğretim programı Ders kitapları Çalışma kitapları Öğretmen kılavuz kitapları
Türkiye'deki sınıf içi ilköğretim matematik ders öğretimi, ülkemizdeki politik, sınıfsal, kültürel ve ataerkil değer ve görüşlerden hangi ölçüde bağımsızdır?	Konu anlatımını, verilen örnekleri, sorulan soruları, öğrencilerin tartışmalarını, günlük ödevleri, proje ödevlerini içeren matematik sınıflarındaki uygulamalar ve iletişim
İlköğretim matematik öğretmenlerinin, matematik ve politik, sınıfsal, kültürel ve ataerkil değerler ve görüşlerin ilişkisi üzerine düşünceleri nelerdir?	Katılımcı öğretmenle yapılan birebir derinlemesine görüşmeler

Bu çalışma 2009 yılının başında çalışma için gerekli olan Etik Kurulu izinlerinin alınmasıyla başlamıştır. Gerekli izinlerin alınmasıyla birlikte Ankara iline bağlı 10 ilköğretim okulu belirlenmiş ve Milli Eğitim Bakanlığı'na başvurulmuştur. Belirlenen okulların arasından Safran İÖO idarecileri ve matematik öğretmeni çalışmaya katılmaya gönüllü olmuşlardır. Okulun matematik öğretmeni, Selin öğretmen, ile birlikte çalışmanın yürütüleceği 7. sınıf şubesi kararlaştırılmış ve araştırmacı öğretmen tarafından sınıfa tanıtılmıştır. Araştırmacı 2009-2010 öğretim yılının ilk döneminin son iki ayında pilot gözlemlere başlamış ve öğretmeni, öğrencileri ve sınıf ortamını yakında tanıma fırsatı bulmuştur. İkinci yarıyılın başlamasıyla birlikte çalışmanın asıl gözlemleri başlamış ve 7-A sınıfının tüm matematik dersleri tüm yarıyıl boyunca gözlemlenmiştir. Toplam 12 hafta ve haftada 4 saat ders gözlemi gerçekleştirilmiştir. Ayrıca bu gözlemler süresinde öğrencilerin ve öğretmenin kullanmakta olduğu ders kitapları, çalışma kitapları ve öğretmen kılavuz kitaplarının kopyaları edinilmiştir. İkinci yarıyılın sonuyla birlikte gözlemler tamamlanmış ve öğretmenle ilk birebir derinlemesine görüşme gerçekleştirilmiştir. Bu görüşmeden sonra öğretim programı, ders kitapları, ders gözlemleri ve öğretmen görüşlerinin ilk analizleri yapılmış ve ardından 2011 yılının başında katılımcı öğretmen ile ikinci birebir derinlemesine görüşme gerçekleştirilmiştir. Böylelikle tüm veri toplama süreci tamamlanmıştır. Çalışmanın başından itibaren geçen süreç Tablo 2'de özetlenmektedir.

Tablo 2. Veri Toplama ve Analiz Süreci

Tarih	Veri Toplama ve Analiz Etkinliği
Eylül 2009	Etik Kurulu İzinleri
Ekim 2009	Katılımcı Okul ve Öğretmenin belirlenmesi
Kasım 2009 – Aralık 2009	Pilot Gözlemler
Şubat 2010 – Haziran 2010	Gözlemler
Şubat 2010 – Haziran 2010	Ders Kitaplarının Toplanması

Tablo 2. Veri Toplama ve Analiz Süreci (Devamı)

Haziran 2010	Öğretmenle İlk Görüşme
Temmuz 2010	Veri Analizi Kodlama Listesinin Oluşturulması
Temmuz 2010 – Ağustos 2010	Öğretim Programı ve Ders Kitaplarının Kodlanması
Ağustos 2010	Kodlama Listesinin Revize Edilmesi
Ağustos 2010 – Aralık 2010	Gözlem Notlarının Kodlanması
Aralık 2010	Okul İdarecileri ile Görüşme
Ocak 2011	Öğretmenle Son Görüşme
Ocak 2011	Öğretmen Görüşlerinin Kodlanması
Şubat 2011	Kodlama Listesinin Revize Edilmesi
Şubat 2011 – Mart 2011	Bütün Verilerin Tekrar Kodlanması
Mart 2011	Sonuçların Bir Araya Getirilmesi

2.3 Veri Analizi

Araştırmanın ilk veri analizi ders gözlemlerinin ve öğretmenle yapılan ilk görüşmelerin tamamlanmasının ardından gerçekleştirilmiştir. Bu ilk analiz için eleştirel matematik eğitimi alan yazınını ve öğretim programı ve ders kitaplarının incelenmesiyle bir kodlama listesi oluşturulmuştur. Bu kodlama listesi ders gözlemlerinin ve öğretmen görüşlerinin kodlanması sürecinde tekrar gözden geçirilmiş ve revize edilmiştir. Araştırma için gerekli olan tüm verilerin toplanmasının ve araştırmacının tüm verileri ilk kez analiz etmesinin ardından çalışmada kullanılan kodlama listesi son haline getirilmiştir. Oluşturulan bu kodlama listesi Tablo 3'de sunulmaktadır.

Tablo 3. Veri Analizi için Kodlama Listesi

Tema	Kategoriler	Örnekler
Cinsiyetçilik	Anne Rolü (AR)	Annesi, Ahmet'ten yandaki alışveriş listesinde yer alan ürünleri almasını ister Meral bir gün hastalanır ve ateşi yükselir. Annesi de onu doktora götürür Merve'nin annesi piknik için çeyrek ekmeklerden sandviç hazırlayacaktır
	Baba Rolü (BR)	Babalarının verdiği 56Tl'yi iki kardeş Orhan ve Erhan 5/3 oranında paylaşmak istiyorlar Mahalleye yeni taşınan Selim Bey, kızını 7.sınıfa kaydettirmek istemektedir İbrahim ve İsmail babalarından miras kalan araziyi eşit olarak bölüşmek istiyorlar
	Kadın Mesleği (KM)	Aylin öğretmenin aldığı çiçeğin kırmızı olma olasılığı nedir Serap ve Merve aynı hastanede hemşire olarak çalışmaktadırlar Zehra Hanım bir roman yazarıdır
	Erkek Mesleği (EM)	İbrahim Bey bir diş doktorudur Okul müdürü zafer bey, okuldaki öğretmen-öğrenci oranının 3/85 olduğunu söylüyor Hasan usta evine çatı yapmak istedi
	Kadın Etkinliği (KE)	Aysel Hanım misafirleri için yemek hazırlayacaktır Zehra harcamalarını kredi kartıyla yapmaktadır Selma Hanım 3 adet gömlek siparişi verdi
	Erkek Etkinliği (EE)	Ayhan Bey iş seyahatinde genellikle uçağı kullanır Haluk bey ailesi için yüzeyi düzgün çokgen olan bir masa yapmak istiyor Mehmet Bey günlük aldığı gazete için 55kr, haftalık aldığı haber dergisi için 2,5Tl ödemektedir

Tablo 3. Veri Analizi için Kodlama Listesi (Devamı)

Neo-liberalizm	Şirket Kültürü (ŞK)	Yeni açılacak bir eczanenin gelirinin yüksek olabilmesi için neler yapılabileceği ile ilgili araştırma soruları hazırlayınız Bir dondurmacı dükkânınızın olduğunu düşünün. Dükkânınızın gelir gider durumu ile ilgili verileri hangi grafik çeşidi ile temsil edersiniz? Beyaz süt firmasının süt satışı karşılığında elde ettiği kar miktarı yandaki grafikte görülmektedir
Sınıf Kültürü	Aile Hayatı (AH)	Mert eşi ve iki çocuğu her hafta sonu tiyatro, sinema, sergi vb. etkinliklere katılırlar. Cansu, yaz tatilinde ailesiyle gittiği Çanakkale Şehitliğinde çok sayıda fotoğraf çeker
	Yetişkin Hayatı (YH)	Ali Bey sağlığına dikkat eden bir insandır. Günlük hayatın stres dolu temposundan kaçıp dinlenebileceği bir yayla evi almaya karar verir Okan bir kamera almak istemiş ve farklı marka ve modeldeki kameraların fiyatlarını araştırmıştır
	Çocukların Hayatı (ÇH)	Aşağıdaki paragraf bir okulun 6.sınıf öğrencilerinin kardeş okula yaptıkları kitap yardımını anlatıyor Şengül doğum günü partisi için marketten meyve suyu, çikolata ve şekerleme alacaktır
Milliyetçilik	Milliyetçilik	Türk insanı; zevkini, estetiğini, duygusallığını, hoşgörüsünü, pratikliğini üretmiş olduğu el sanatları ile yansıtmaktadır Böyle bir başarıyı yakalayan ilk Türk sporcu olarak dünyanın zirvesinde dalgalanan Türk bayrağı ile Türkiye'nin adını dünya tarihine altın harflerle yazdırdı
	Militarizm	Resmi törenlerde askerlerin nasıl yürüdüklerine dikkat ettiniz mi? Askerlerin aynı anda ve uyum içinde yaptıkları gösteriler, halkımızı gururlandırmakta ve coşkuyla karşılanmaktadır

Yukarıda verilen kodlama listesi oluşturulduktan sonra bir araya getirilen tüm veri, araştırmacı ve bir diğer matematik eğitimi araştırmacısı tarafından birlikte kodlanmıştır. Araştırmada sunulan sonuçlar bu birlikte kodlama sürecinin ürünüdür.

3. Neo-liberal Eğitim Politikaları ve Matematik

Son yıllarda sağ muhafazakâr hareketlerin ve neo-liberal eğitim anlayışının eğitimde ve toplumsal alanda yaygınlaşmasıyla birlikte, eğitimin ücretsiz bir kamusal hak olarak tanımlanmasında ve içeriğinin daha özgür bireyler ve daha adil bir toplumsal hayat amacıyla şekillenmesinde belirgin kısıtlamalar oluşmaya başladığı gözlenmektedir. Neo-liberalizm diğer kamusal hizmetlerde olduğu gibi eğitim alanında da her bireyin bu hizmetleri maddi olarak kendisinin karşılaması gerektiği konusunda yoğun bir baskı oluşturmaya başlamıştır. Bu yapısal baskıyla beraber eğitimsel içeriğin de daha fazla piyasanın istediği şekilde dönüştürülmeye başladığı ifade edilmektedir (Apple, 2001; Lynch, 2006). Türkiye'deki eğitim sistemi de bu eğilime bir istisna oluşturamamaktadır: Eğitimin serbest piyasada pazarlanabilecek bir ürün olarak algılanması kamusal alanda gittikçe daha fazla normalleştirilmektedir. Bu bölümde neo-liberal eğitim politikalarının uzantısı olarak 'kâr odaklı piyasa dilinin' matematik eğitiminde ne ölçüde ve nasıl yer almakta olduğu sunulacaktır.

Kâr odaklı piyasa dilinin matematik eğitimindeki yansımaları araştırıldığında ilk olarak öğretim programındaki 'girişimcilik' tanımıyla karşılaşılmıştır. Girişimcilik becerisi öğretim programında şöyle tanımlanmaktadır:

> *Girişimcilik; sosyal ilişkilerde, iletişimde, iş dünyasında ve benzeri alanlarda gerekli ve etkili davranışları uygun bir şekilde ve uygun zamanda ortaya koymak veya talep görebilecek bir ürünü veya hizmeti daha iyi üretebilmek ya da pazarlayabilmek amacıyla yeni bir sistem kurmak için gerekli olan becerilerdir. Girişimcilik; empati kurma, insan*

> *ilişkilerinde uyumlu davranışları gösterebilme, plan yapma, planlarını uygulayabilme, risk alma; herhangi bir alanda ihtiyaç duyulabilecek bir ürünün gerekliliğini sezme, ürünü planlama, üretme, pazar araştırması yapma, pazarlayabilme gibi alt becerileri içerir. (Öğretim Programı, 2009, p.12)*

Bu tanımda piyasa dilinin etkisini iki noktada belirlemek mümkündür; (i) *iş dünyasında ve benzeri alanlarda gerekli ve etkili davranışları uygun bir şekilde ve uygun zamanda ortaya koymak* ve (ii) *talep görebilecek bir ürünü veya hizmeti daha iyi üretebilmek ya da pazarlayabilmek amacıyla yeni bir sistem kurmak.*

Piyasa dilinin öğretim programındaki bir diğer yansıması ise 'tüketici' olmaya ve özellikle 'bilinçli tüketici' olmaya yapılan vurgudur. Öğretim programındaki bu 'tüketici' vurgusu neo-liberal eğitim politikalarının eğitimli insanları 'piyasa odaklı', 'tüketim toplumunun bir parçası' ve 'sadece kendi çıkarlarını düşünen' bireyler olarak tanımlamasıyla örtüşmektedir.

Ayrıca, hem girişimciliğe hem de tüketici olmaya yapılan vurgular birlikte değerlendirildiğinde, öğretim programının piyasa ilişkileri için kullandığı dili aynı zamanda sosyal ilişkiler için de kullandığı gözlenmiştir. Bu birlikte kullanım sosyal yaşamdaki ilişkilerin (örneğin öğrenci veya vatandaş olmak) piyasa ilişkilerine indirgenmesine yönelik bir eğilimin göstergesi olarak yorumlanmıştır.

Öğretim programında gözlemlenen bu durumlar ders kitaplarındaki örneklerle de desteklenmektedir. Ders kitaplarında çalışma hayatını konu edinen örneklerin neredeyse hepsinde öğrencilerin matematiksel bilgi ve becerilerini ya (i) şirket yöneticisi olarak şirketlerinin karlarını nasıl arttırabilecekleri hakkında ya da (ii) şirket çalışanı olarak şirket ürünlerini nasıl daha fazla satabilecekleri hakkında kullanmaları beklenmektedir. 6. sınıf öğretmen kılavuz kitabındaki bir proje ödevi oldukça açıklayıcıdır:

Performans Ödevi: Matematikçi Yönetici

Sevgili öğrenciler, bir otobüs firmasında yönetici olarak çalışıyorsunuz. Size dört ayda firmanızda seyahat eden yolcu sayısını gösteren aşağıdaki tablo verildi.

1. Hangi aylar arası düşüş ve yükseliş olduğunu uygun grafik çizerek yorumlayınız.

2. Yolcuların firmanızı tercih etmeleri için istek ve önerilerini almak istiyorsunuz. Hangi soruları hazırlarsınız?

3. Bu soruları nasıl bir gruba sorarsınız?

4. Hangi aylarda ek sefer düzenlersiniz? (Öğretmen Kılavuz Kitabı 6, 2009, p.13)

Bu ve benzer örnekler göstermektedir ki ders kitaplarındaki sorularda öğrencilerden beklenen temel davranış satışları ve kârlarını arttırmak için beyin fırtınası yapmalarıdır. Ayrıca, ders kitaplarında karşılaşılan şirket dilinin hâkim olduğu bir diğer nokta ise şirketlerin kâr ve zarar durumlarının incelendiği matematik problemleridir.

Kâr odaklı şirket dili konusunda ders işlenişinde karşılaşılan örneklerin sayısı öğretim programı ve ders kitaplarına oranla daha az olsa da dersteki örnekler bu metinlerdeki örneklerle oldukça tutarlıdır. 7-A sınıfı öğrencileri derslerde yine şirketlerin kâr ve zarar durumlarına odaklanan veya yatırım yapmanın konu edinildiği problemleri çözmek için zaman harcamışlardır. Ayrıca bu öğrencilerin gerçek yaşam şartları dikkate alındığında, çözmek için çaba harcadıkları problemlerin öğrencilerin maddi olanaklarından oldukça uzak durumları betimlediği anlaşılmaktadır.

Kâr odaklı şirket dili konusunda sunulan son bulgular öğretmenin bu konu hakkındaki görüşlerini içermektedir. Öğretmenin ekonomik ve politik görüşler ile matematik eğitimi arasındaki ilişkiye dair düşünceleri matematik eğitiminin politik olarak bağımsız/tarafsız olduğu noktasında toplanmaktadır. Öğretmenin açıklamalarına dayanarak bu politik tarafsızlık düşüncesinin iki temel ayağı olduğu saptanmıştır; (i)

problemlerde genellikle sadece sayılara ve işlemlere, yani problemlerin matematiksel kısmına odaklanılması ve (ii) politik görüşler ve matematik eğitimi arasında herhangi bir ilişkinin mümkün olmadığının düşünülmesi.

Sonuç olarak, eğitim programının, ders kitaplarının, ders işlenişlerinin ve öğretmen görüşlerinin incelenmesi ilköğretim matematik eğitiminde öğrencilerin matematik bilgi ve becerilerini kamusal refah ve toplumsal adalet yerine özel şirketlerin yararına kullanmalarına teşvik edildiğini işaret etmektedir. Ders kitapları ve çalışma kitapları, hem öğretmen hem de öğrenciler için temel kaynak olduğu için, bu teşvikteki temel aracı konumundadırlar. Fakat ders kitaplarındaki bu içeriklerin kökeni öğretim programının 'girişimcilik' kazanımına olan vurgusunda yatmaktadır. Diğer yandan, öğretmenin matematik eğitiminin politik olarak bu konumlanışının farkında olmaması neo-liberal eğilimlerin bu zincirleme etkilerini kırma şansını da ortadan kaldırmaktadır.

4. Sınıf Kültürü ve Matematik

Çalışma kapsamında incelenen ikinci konu 'sınıf kültürü' ile matematik eğitimi arasındaki ilişkidir. Sınıf kültürü kavramı, bu çalışma kapsamında, farklı sosyal sınıflara ait farklı kültürel etkinliklerin matematik eğitiminde eşit şekilde değer görüp görmediğini ve dolayısıyla farklı sosyal sınıflardan gelen öğrenciler için bir eşitsizlik yaratıp yaratmadığını araştırmak için kullanılmıştır. 'Sınıf kültürü' ve matematik eğitimi ilişkisi Bourdiue'nin 'kültürel sermaye' kavramının yardımıyla incelenmiştir. Bu bölümde sunulan bulgular aynı zamanda 'matematik eğitiminde kimlerin hayatı sunulmaktadır?' sorusuna da cevap oluşturacaktır.

'Sınıf kültürü' ile ilgili belirlenen ilk noktalar eğitim programındaki iki önemli vurgudur; (i) matematik eğitimi ile öğrencilerin günlük/gerçek hayatı arasındaki ilişkiye yapılan vurgu, (ii) günlük/gerçek hayat problemlerinin çözülmesine yapılan vurgu. Öğretim programının vizyonu "matematikle ilgili kavramların, somut ve sonlu yaşam modellerinden yola çıkılarak ele alınması" gerektiğini belirtmektedir. Ayrıca,

öğrencilerin "matematiği günlük hayatlarında kullanma" ve "matematiğin gerçek hayattaki önemini takdir etme" becerilerinin geliştirilmesi matematik eğitiminin öncelikli hedefleri olarak işaret edilmiştir. Benzer örneklerin de yardımıyla "gerçek hayata ilişkin problemlerin çözülmesinin" öğretim programının odağına yerleştirildiği sonucuna varılmıştır. Fakat bununla birlikte 'gerçek hayatın ne olduğu' ve 'gerçek hayat olarak kimlerin hayatının sunulduğu' öğretim programında tanımlanmamıştır. Bu soruların cevabının verilmiyor olması, sosyal hayatta ve eğitim örgütlenmesinde var olan durumda kendilerine yeterince yer bulamayan alt sosyal sınıfların matematik eğitiminde de sessizce görmezden gelinmesi riskini doğurmaktadır.

Ders kitaplarının incelenmesi yukarıda bahsedilen riskin gerçeğe dönüştüğüne işaret etmiştir. Ders kitaplarındaki günlük/gerçek hayat problemleri 3 ana başlık altında incelenmiştir; (i) aile yaşantısını konu edinen problemler, (ii) çocukların hayatını konu edinen problemler ve (iii) yetişkin bir karakterin hayatını konu edinen problemler. İlk olarak, yapılan analizler ders kitaplarında betimlenen ailelerin *her hafta sonu tiyatro, sinema, sergi vb. etkinliklere katılan, yaz tatillerinde deniz yoluyla farklı tatil yerlerini gezen, bayram tatillerinde aile büyüklerini veya ören yerlerini ziyaret eden, yeni bir ev alan veya evini dekore eden* aileler olduğu anlaşılmıştır. İkinci olarak, ders kitaplarında betimlenen çocukların *yıl boyunca dil kursu, enstrüman kursu veya spor kursu gibi farklı kurslara katılan, arkadaşlarıyla birlikte yüzme havuzuna gitmek, gezilere katılmak gibi etkinliklerde bulunan, doğum günü partisi için alışverişe çıkan, bilgisayarı ve kitaplığı olan, sınıf arkadaşlarıyla birlikte tarihi yerlere gezi veya yoksul okullara yardım kampanyası düzenleyen* çocuklar olduğu anlaşılmıştır. Üçüncü olarak, ders kitaplarında betimlenen yetişkinlerin *sağlıklı yaşamaya özen gösteren ve bunun için ya günlük hayatın stres dolu temposundan kaçıp dinlenebileceği bir yayla evi almaya karar veren ya da bir spor kulübüne üye olan, ve başta teknolojik aletler olmak üzere farklı tüketim malzemelerinin fiyatlarını araştıran* yetişkinler olduğu anlaşılmıştır. Bu betimlemelerin ışığında matematik problemlerindeki 'gerçek hayat'

kavramının orta ve üst sosyal sınıfların hayatlarıyla yer değiştirildiği sonucuna varılmıştır.

Bununla birlikte, ders işlenişlerinin incelenmesi derste çözülen problemlerin de ders kitaplarındaki problemler benzer bir 'sınıf kültürü' profili çizdiklerini göstermiştir. Diğer yandan ders işlenişlerindeki iletişimler ve etkileşimler göstermiştir ki, problem çözme süreçlerinde temel odak noktası formüller ve işlemler olmakta ve problemlerin kültürel bağlamları neredeyse gözden kaçırılmakta ve buharlaşmaktadır. Ayrıca ders gözlemleri işaret etmiştir ki, günlük hayat problemi olarak matematik derslerinde sunulan problemler 7-A sınıfı öğrencilerinin hayatlarından oldukça farklıdır ve bu öğrencilerin ve ailelerinin sorunlarına dair içerikler matematik eğitiminde yer bulamamaktadır.

'Sınıf kültürü' konusunda sunulan son bulgular öğretmenin bu konu hakkındaki görüşlerini içermektedir. Öğretmenin matematik eğitimi ile sınıf kültürü arasındaki ilişkiye dair görüşleri matematik eğitiminin politikayla olan ilişkisi hakkındaki görüşleriyle örtüşmektedir. Ders kitaplarındaki ve ders işlenişlerindeki örnekler aksini gösterse de matematik öğretmeni tüm sosyal ve kültürel değerlere ve davranışlara eşit şekilde yaklaşıldığını düşünmektedir. Diğer yandan, öğretmenin, derslerdeki günlük hayat problemlerinin oldukça kısıtlı olmasını iki nedene bağladığı anlaşılmaktadır; (i) bu tür gerçek hayat problemlerinin etkilerinin çok fazla olmadığını ve sadece başarılı öğrencilerde işe yaradığını düşünmesi ve (ii) öğrencilerin hepsine hitap edebilecek ve onların ilgisini çekebilecek gerçek hayat problemleri kurmanın oldukça zor olduğunu düşünmesi.

Sonuç olarak, matematik eğitimindeki ve problemlerindeki 'gerçek hayat' kavramı sadece orta ve üst-orta sosyal sınıfların hayatlarını karşılamaktadır. Çalışmanın bulguları ışığında ders kitaplarında ve sınıflarda sunulan matematik problemlerinin işçi sınıfı çocuklarının hayatlarına dair bir referans içermediği ve bunun orta ve üst-orta sınıf çocuklarına kültürel bir avantaj sağlayabileceği sonucuna varılmıştır. Hali hazırda

ekonomik kaynaklar olarak işçi sınıfı çocuklarına karşı zaten avantajlı olan bu gruplar, eğitim süreçlerinde kültürel olarak da bir üstünlük sağlamaktadırlar. Matematik eğitimi işçi sınıfı çocuklarına onları çevreleyen sosyal, kültürel ve politik durumları gösterme olanağına sahipse de bu olanak orta sınıf kültürüyle yoğrulmuş bir içerikte ortadan kalkmaktadır.

5. Cinsiyetçilik ve Matematik

Eğitimin cinsiyet rollerinin geliştirilmesi ve içselleştirilmesinde önemli bir yeri olduğu birçok eğitimci tarafından vurgulanmıştır (Esen, 2007; Özdoğru, Aksoy, Erdoğan ve Gök, 2004). Türkiye'de bu alanda yapılan son yıllardaki çalışmalar eğitimsel metinlerin ve içeriklerin cinsiyetçi öğeler konusunda önemli handikapları olduğunu göstermektedir (Esen ve Bağlı, 2002; Kılıç ve Eyüp, 2011). Fakat bu değerli araştırmalar genel olarak Türkçe ve Hayat Bilgisi gibi sosyal dersler üzerine odaklanmışlardır. Bu alan yazınının ışığında bu araştırma kapsamında incelenen üçüncü nokta matematik eğitiminin cinsiyetçi söylemler içerip içermediği ile ilgilidir.

Öğretim programının incelenmesi sonucunda programda herhangi bir cinsiyetçi öğeye rastlanmamış olsa da kadın-erkek eşitliğine olumlu katkı sunmaya yönelik herhangi bir ifadeye de rastlanmamıştır. Ne öğretim programının vizyonu, ne de programın genel amaçları cinsiyetçi söylemlere karşı önlem almayı amaçlayan ifadeler içermektedir. Son yıllarda farklı ülkelerdeki öğretim programları ve uluslararası metinler cinsiyet ayrımcılığına karşı önlem almayı teşvik ediyor olsa da (Eurydice, 2010), Türkiye'deki ilköğretim matematik eğitim programının böyle bir duyarlılık göstermediği anlaşılmaktadır.

Öğretim programında böyle bir duyarlılığın sergilenmemiş olması ders kitaplarında cinsiyetçi öğelerle karşılaşılması sonucunu doğurmuştur. İncelenen ders kitaplarındaki cinsiyetçi öğeler üç ana başlık altında toplanmıştır; (i) cinsiyetlere göre meslek dağılımları, (ii) cinsiyetlere göre etkinlikler ve (iii) anne – baba rolleri. İlk olarak

cinsiyetlere göre meslek dağılımları incelendiğinde matematik problemlerindeki erkek karakterlerin kadın karakterlere göre daha fazla sayıda ve çok daha fazla çeşitlilikte meslek sahibi olduğu görülmüştür; erkek karakterler 24 farklı meslekte betimlenirken, kadın karakterler sadece 9 farklı meslekte betimlenmişlerdir. Ayrıca kadın karakterlerin meslekleri öğretmenlik, hemşirelik, halı dokumacılığı ve kasiyerlik gibi toplumsal alanda da kadına özgü olduğu düşünülen mesleklerdir. İkinci olarak cinsiyetlere göre etkinlikler incelendiğinde; erkek karakterlerin *işe giderken, iş seyahatine çıkarken, toplantı organize ederken, ev inşa ederken veya bahçe işleriyle uğraşırken* betimlendiği, kadın karakterlerin ise *misafirleri için yemek hazırlarken, doğum günü partisi için alışveriş yaparken, ailesi için kek hazırlarken veya kendi için elbise dikerken* betimlediği sonucuna ulaşılmıştır. Kısaca erkek karakterler genellikle iş ortamında ve işleriyle ilgili etkinliklerde resmedilirken, kadın karakterler ev ortamında ve ev hanımlığı ile ilgili etkinliklerde resmedilmiştir. Üçüncü olarak, matematik problemlerinde betimlenen anne ve baba figürleri ataerkil bir aile yapısını referans almaktadır; babalar *çocuklarına harçlık verirken, onlara miras bırakırken, gazete ve dergi aldırırken ve çocuklarına hediye alırken* resmedilirken, anneler *çocuklarına yemek hazırlarken, alışveriş yaparken ve hastalandıklarında çocukları ile ilgilenirken* resmedilmektedirler.

Ders kitaplarının aksine gözlem yapılan dersler süresince ders işlenişlerinde nitelik veya nicelik olarak cinsiyet ayrımcılığına yol açabilecek bir durumla karşılaşılmamıştır. Kız ve erkek öğrencilerin tahtaya kalkma oranları ve öğretmenlerinden geri dönüt alma olanları anlamlı bir farklılık göstermemiştir.

Son olarak öğretmenin ifadeleri de sınıf gözlemlerini destekler niteliktedir. Öğretmen kız ve erkek öğrencilerine eşit şekilde yaklaşmaya gayret gösterdiğini ifade etmektedir. Diğer yandan öğretmenin ders kitaplarındaki cinsiyetçi içerikler üzerine bir farkındalığı olmadığı anlaşılmıştır.

Sonuç olarak, kadın-erkek eşitliği konusunda ders kitaplarında nicelik açısından bir iyileşmeden bahsedilebilirse de nitelik açısından sorunların devam ettiği ifade edilmiştir. Kadın-erkek eşitliğini göz önünde bulundurması gereken ilköğretim matematik ders kitaplarının, aksine birçok cinsiyetçi öğe içerdiği anlaşılmıştır.

6. Milliyetçilik ve Matematik

Araştırma kapsamında incelenen son nokta milliyetçi/militarist içeriğin ilköğretim matematik eğitiminde ne ölçüde ve nasıl yer aldığıdır. Tek bir milliyetçilik tanımının olmadığının bilinciyle, bu çalışmada belli bir ırkın üstünlüğünü ve eşsizliğini iddia eden milliyetçi ifadeler araştırılacaktır. Bu tür ifadelerin araştırılacak olmasının sebebi böyle bir milliyetçilik tanımının insan haklarına ve toplumsal adaletin sağlanmasına karşı önemli bir direnç noktası oluşturabilecek olmasıdır.

Milliyetçilik söyleminin ilköğretim matematik eğitimindeki ilk yansımaları öğretim programında ve ders kitaplarında Türkiye'de sadece Türklerin yaşadığına yapılan göndermeler ve Türkiye'de yaşayan diğer etnik gruplara dair herhangi bir içeriğin bulunmamasıdır. Buna paralel olarak Türkiye'de yaşayan tüm halkların ortak kültürü olan eser ve değerler sadece Türklere ait olarak resmedilmektedir. Örneğin, *el dokumaları, halk oyunları, seramikçilik gibi Anadolu'nun her köşesine yayılmış kültürel değerler ve eserler* ders kitaplarında sadece Türklere ait olarak sunulmaktadır. İlköğretim matematik eğitiminde karşılaşılan bu örnekler, eğitim alanındaki güncel araştırmalarda ortaya koyulan ve farklı etnik grupların ve gayrimüslim toplulukların eğitimsel metinlerde ve süreçlerde görmezden gelindiğine işaret eden bulgularla tutarlılık göstermektedir.

Milliyetçilik konusunda gözlemlenen ikinci nokta Türk kültürü, sporu, değerleri vb. özelliklerine dair öğretim programı ve ders kitaplarındaki övgü dolu vurgulardır. Farklı etnik ve dini grupların matematik eğitimindeki 'yokluğunun/görünmezliğinin' aksine, Türklerin farklı özellikleri sürekli övgülerle bahsedilmektedir. Bu övgülerle ek olarak,

öğretim programında *duygusallık, hoşgörü ve pratiklik* gibi evrensel insani değerler sadece Türk milletine özgü olduğu anlayışıyla sunulmaktadır.

Milliyetçi söylemin matematik eğitimindeki yansımaları niteliğindeki bu ifadelere ek olarak sınırlı sayıda da olsa militarist ifadelere de rastlanmaktadır.

Öğretmenin matematik eğitimi ile milliyetçilik arasındaki ilişkiye dair görüşleri ise bu tür milliyetçi ifadelerin öğrencilerin bu ülkenin değerlerine saygı göstermesi için gerekli olduğu şeklindedir. Öğretmenin bu konudaki görüşleri onun milliyetçiliği bir politik duruş/akım olarak değil, doğal ve normal bir olgu olarak algılamasından kaynaklanmaktadır.

7. Sonuçlar ve Öneriler

Araştırmanın sonuçlarına göre, ilköğretim matematik eğitimi; (i) öğrencileri matematik bilgi ve becerilerini toplumsal fayda yerine özel şirketlerin yararları için kullanmaya yönlendirmekte, (ii) 'gerçek yaşam' kavramının içeriğini orta ve üst orta sosyal sınıfların yaşantısıyla doldurmakta, (iii) cinsiyet ayrımcılığına kapı aralayacak ifadeler içermekte ve (iv) etnik ve Müslüman olmayan azınlıkları görmezden gelerek milliyetçiliği beslemektedir.

Yapılan analizlerin ve ortaya çıkan sonuçların ışığında matematik eğitimcileri, program geliştiriciler, ders kitabı yazarları ve öğretmen yetiştiriciler için aşağıdaki öneriler sunulmuştur. Öncelikle araştırma bulguları ortaya koymaktadır ki, matematik öğretim programının içeriği, programda yer alan ve yer almayan konular, ders kitaplarında ve ders işlenişlerinde doğrudan karşılık bulmaktadır. Dolayısıyla sınıfsal ve kültürel farklılıklara, cinsiyetçiliğe ve farklı etnik ve dini gruplara duyarlı bir matematik eğitimi için değişime öğretim programından başlamak zorunludur. Bu çalışma kapsamında ayrı ayrı başlıklarda sunulmuş olsa da bu konular öğretim programında bir arada ele alınmalıdır. Oldukça yoğun bir 'piyasa dili/kültürü' ile şekillenmiş olan öğretim

programında ve ders kitaplarında, serbest piyasa ekonomisinin dili değil kamusal yararların ve toplumsal adalet odaklı bir dilin hâkim kılınması gerekmektedir. Bununla birlikte öğretim programındaki günlük/gerçek hayat vurgusu korunmalı fakat bu vurgu özellikle işçi sınıfı çocuklarının yaşantılarını ve problemlerini de gündeme alan bir içerikle zenginleştirilmelidir. Ayrıca matematik programı ve ders kitapları kadın – erkek eşitliğini odağına alan bir bakış açısıyla yeniden düzenlenmeli ve bu eşitlik algısını zedeleyebilecek tüm cinsiyetçi ifadeler bu metinlerden temizlenmelidir. Diğer yandan, matematik eğitimi içeriği farklı etnik ve dini grupları da bu ülkenin saygın bir bileşeni olarak yansıtacak şekilde zenginleştirilmelidir.