

MOTIVATION OF STUDENTS TOWARDS MATHEMATICS
IN TRADE VOCATIONAL HIGH SCHOOLS IN ANKARA:
AN EXPLORATORY STUDY

A MASTER'S THESIS

BY

DİLAY ERGÜN

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Dilay Ergün

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SUPERVISEE: DİLAY ERGÜN

I certify that I have read this thesis and have found that it is fully adequate, in scope and in quality, as a thesis for the degree of Master of Arts in Curriculum and Instruction.

Asst Prof. Dr. Minkee Kim

I certify that I have read this thesis and have found that it is fully adequate, in scope and in quality, as a thesis for the degree of Master of Arts in Curriculum and Instruction.

Examining Committee Member Title and Name

I certify that I have read this thesis and have found that it is fully adequate, in scope and in quality, as a thesis for the degree of Master of Arts in Curriculum and Instruction.

Examining Committee Member Title and Name

Approval of the Graduate School of Education

Director Title and Name

ABSTRACT

MOTIVATION OF STUDENTS TOWARDS MATHEMATICS LESSONS IN TRADE VOCATIONAL HIGH SCHOOLS IN ANKARA, TURKEY: AN EXPLORATORY STUDY

Dilay Ergün

M. A., Program of Curriculum and Instruction

Supervisor: Asst. Prof. Dr. Minkee Kim

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The primary aim of the study is to explore the factors that affect motivation of students towards mathematics in trade vocational high schools in Ankara as perceived by their mathematics teachers. The teachers' opinions about the common types of motivation (intrinsic or extrinsic) among students, the role and place of the goal orientation theory on students' motivation towards mathematics lessons was investigated.

This study was conducted with an exploratory mixed-methods design which included two phases. Trade vocational high schools which consisted of Accounting and Financing department were the sample of this study. In the first phase, in a trade vocational high school in Çankaya, Turkey, a focus group interview was conducted with seven mathematics teachers. Afterwards, findings from the interview were analyzed by content analysis and a survey was developed based on these findings. In

the second phase of the study, data were collected by surveying 31 mathematics teachers from six trade vocational high schools in Ankara, Turkey.

The results showed that external incentives are more efficient than internal incentives (curiosity or interest) for trade vocational high school students. The most effective factor was found to be that students were studying mathematics in order to obtain a high school diploma. The second most effective factor was that students valued getting rewards from their teachers. The goal orientation theory ranked below extrinsic motivation, indicating that students are less motivated by a desire of having skills for a professional life. Results showed that students did not have sufficient confidence in their mathematical ability to be successful in lessons or to want a professional life. Furthermore, the teachers stated that the curriculum as a whole does not satisfy students' professional needs, as it is not suitable for students' mathematics knowledge level.

Key words: Motivation, intrinsic motivation, extrinsic motivation, the goal orientation theory, trade vocational high schools, accounting and financing department, opinions of mathematics teachers, mathematic curriculum in trade vocational high schools.

ÖZET

ANKARA'DAKİ TİCARET MESLEK LİSESİ ÖĞRENCİLERİNİN MATEMATİK DERSİNDEKİ MOTİVASYONUNU ETKİLEYEN FAKTÖRLER

Dilay Ergün

Yüksek Lisans, Eğitim Programları ve Öğretim

Tez Yöneticisi: Yrd. Doç. Dr. Minkee Kim

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Bu tez çalışmasının öncelikli amacı Ankara'daki ticaret meslek lisesi öğrencilerinin matematik dersi için motivasyonlarını etkileyen nedenleri araştırmak ve öğrencilerin çoğunlukla sahip oldukları motivasyon türünü (içsel yada dışsal) matematik öğretmenlerinin bakış açısıyla belirlemektir. Ayrıca hedef yönelim teorisinin öğrenci motivasyonu üzerindeki etkileri de araştırılmıştır.

Bu çalışma keşfedici karma araştırma yöntemiyle yürütülmüştür ve çalışmaya Ankara'da, Muhasebe ve Finansman dalına sahip Ticaret Meslek Liseleri dâhil edilmiştir. Araştırmanın ilk basamağında, Çankaya'daki bir ticaret meslek lisesindeki 7 matematik öğretmeniyle odak grup mülakatı yapılmıştır. Öğretmenlere açık uçlu sorular yönlendirilmiş ve mülakat yardımıyla öğretmenlerin konuyla ilgili düşünceleri toplanmıştır. Mülakattan çıkan veriler içerik analizi yöntemiyle analiz edilmiş ve öğretmenlerin farklı düşüncelerine yer veren bir anket oluşturulmuştur.

Araştırmanın ikinci basamağında ise, mülakat verilerinden oluşturulmuş anket, Ankara'daki 6 ticaret meslek lisesindeki matematik öğretmenlerin elden verilmiştir. Ankara'nın farklı ilçelerine gidilmiş ve ulaşılan toplam 31 matematik öğretmenine anket uygulanmıştır. Daha sonra, anket verileri Excel ve SPSS 18 paketi yardımıyla analiz edilmiştir.

Araştırmanın sonucunda ticaret ve meslek lisesi öğrencilerinin motivasyonunu en çok etkileyen faktör "bir lise diplomasına sahip olmak" olarak bulunmuştur. En çok etkili ikinci faktör ise "başarı sonrası ödül" olarak bulunmuştur. Bu verilere dayanarak ticaret meslek lisesi öğrencilerinin dışsal faktörlerden daha çok etkilendikleri tespit edilmiştir. Ayrıca, anket sonucunda hedef yönelim teorisi ile ilgili öğeler içsel ve dışsal motivasyon faktörlerinin arasında bulunmuştur. Böylelikle hedef yönelim teorisinin içsel motivasyonu arttırmada köprü görevi görebileceği tespit edilmiştir. Araştırmanın sonucunda, ayrıca, öğrencilerin özgüvenlerinin düşük ve temel matematik bilgilerinin eksik olduğu ve ticaret meslek lisesi matematik müfredatının öğrencilerin mesleki ihtiyaçlarına cevap veremediği bulunmuştur.

Anahtar kelimeler: Motivasyon, içsel motivasyon, dışsal motivasyon, hedef yönelim teorisi, ticaret meslek lisesi, muhasebe ve finansman bölümü, matematik öğretmenlerinin görüşleri, ticaret meslek lisesi matematik müfredatı.

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CHAPTER 1: INTRODUCTION

Introduction

In the modern age, mathematics is an essential science whose importance is observable not only in school, but also in daily life when for example, buying medicine, building a hospital, driving a car, and making a forecast of the weather (National Research Council & Mathematical Sciences Educational Board, 1998). The citizens in modern societies need knowledge of mathematics to continue their life.

Although mathematics is a core curriculum subject, many students find it difficult to understand and do not like it very much (Allendoerfer, 1947). Also, many students do not want to participate in the lessons and have negative attitudes towards mathematics. Studies show that one of the reasons for this situation is a lack of motivation (D. Stipek, 1998). For decades, researchers have studied the impact, types and importance of motivation (Berger & Karabenick, 2011; Çakmak & Ercan, 2003; Maslow, 1970; Ryan & Deci, 2000; Slavin, 2006; D. Stipek, 1998). Husman and Lens give an example to explain the types of motivation that may be seen in mathematics lessons:

A student can be highly motivated for a course in mathematics for several reasons. She has been intrinsically interested in numbers and mathematical operations since she was a child. She also studies hard to get a good grade in her exam at the end of the semester. She does this not only because she wants to succeed and not fail, but also because she wants to impress her boyfriend and parents. She is also highly motivated because it is an important subject for her. Indeed, she intends to become a brilliant engineer who makes a lot of money so that she will be financially independent of her partner or parents (Husman & Lens, 1999, p. 113).

Mathematics is also essential in Trade Vocational High Schools and students in these schools have problems due to the lack of mathematics interest and motivation.

Hence, this study will primarily focus on motivation, its types, and one of the well-known motivational theories called the goal orientation theory. Furthermore, the common types of motivation among students, the role and place of the goal orientation theory within intrinsic and extrinsic motivation, and factors that affect motivation in the trade vocational high schools in Ankara will be explored.

Background

Motivation

Motivation is an important aspect of human behavior that is the summation of internal and external factors that affect behaviors, efforts, and curiosities of people towards not only education but also other contexts such as workplace and sports (Barkaukis et. al., 2008). Due to this fact, motivation has become an interesting topic in the area of educational psychology and has been investigated for decades (Weiner, 1990). Ali and colleagues (Ali et. al., 2011) presented that proposed learning and students' behavior towards a lesson could be affected by motivation as:

- Direct behavior toward particular goals
- Lead to increased effort and energy
- Increase initiation of, and persistence in activities
- Enhance cognitive processing
- Determine what consequences are reinforcing
- Lead to improved performance (p.306).

In addition, motivation could be classified into three types that are primary and secondary motives, situational and continuous motives and internal and external motives (Çakmak & Ercan, 2003). This study concentrated on external and internal motives which are also named as extrinsic and intrinsic motivation. Intrinsic motivation is the force that makes students study for the sake of learning, whereas extrinsic motivation is the drive in which students study for showing their potential to others such as teachers, friends, and parents, receiving awards, or avoiding punishments (Ryan & Deci, 2000). Intrinsic motivation has been widely studied by educational researchers due to its significance (Chen, 2011; Çakmak & Ercan, 2003; Deci et. al., 2001; Ryan & Deci, 2000). Researchers believe that intrinsic motivation greatly influences “students’ engagement, involvement, and achievement in the subject and could be used as an important educational outcome in both cognitive and non-cognitive areas” (Chen, 2011, p.24). Chen also stated that intrinsic motivation is more important than extrinsic motivation, since the knowledge of students who are intrinsically motivated will be longer-lasting.

Goal theory

One of the well-known motivational theories used in education is *the goal orientation theory*. It describes the reasons, purposes and ways of achieving objectives rather than focusing on the objectives themselves (Kaplan & Maehr, 2007). It was developed by Carol Ames, Carol Dweck, Marthy Maehr, and John Nicholls collaboratively in the 1970s (Elliot, 2005). Goal theorists claim that there is a relationship between beliefs (goal orientations) and engaging lessons, activities and tasks (D. Stipek, 1998). In the literature, there are numerous studies that investigated the impact of goals to achievements and cognitive and affective outcomes of students (Lau & Lee, 2008). Another issue on goal orientation is investigating the effects of it

based on different cultures. For example, Lau and Lee (2008, p.359) explain that “the same achievement goals may be more or less adaptive for students of different ethnic and cultural backgrounds.”

This study focuses on the comparisons between mastery goal orientation and performance goal orientations. Mastery goals are the goals of students who are motivated by the “desire of knowledge, acquisition, and self-improvement, whereas performance goals are the goals of students who are motivated primarily by “a desire to gain recognition from others and to earn good grades” (Slavin, 2006, p.327).

Numerous researchers also studied implementing these orientations in classrooms (Maehr & Midgley, 1991), defining which goal orientation is more beneficial in education in terms of basically affective and cognitive outcomes, and predicting the types of goals of students (Ames, 1992; Lau & Lee, 2008; Mattern, 2005).

Vocational high schools in Turkey

This study was conducted in the Vocational and Technical High Schools in Ankara.

The need for highly qualified and skillful people is gradually increasing as technology and sciences are developing all around the world (Yörük et. al., 2002).

Therefore, vocational and technical high schools take an important place in education and have great responsibilities for training people who could meet these needs

(Demirli & Kazu, 2002). Since vocational high schools became widespread between

1940s and 1950s, there were 3,153 vocational schools in 2000 in Turkey (Yörük et

al., 2002). Furthermore, vocational high schools could be classified in four groups

such as Vocational and Technical High Schools for boys, Vocational Technical High

Schools for girls, Vocational High Schools for Trade and Tourism and İmam Hatip

High schools (Demirli & Kazu, 2002).

A trade vocational high school is a type of vocational high school that consists of the programs of accounting and financing, retail and marketing, office management and secretaryship, information technologies, electric-electronic technologies and transportation (Ticaret ve Turizm Öğretimi Genel Müdürlüğü, 2010). These schools train students for four years and the curriculum in the ninth grade is the same as the education in normal high schools in Turkey. Students have general courses like science, languages and mathematics in this grade. Moreover, students choose the program according to their interest and competence in which they want to be educated in the 10th grade and choose the sub-program in the 11th grade in which they want to specialize (Ticaret ve Turizm Öğretimi Genel Müdürlüğü, 2010).

Besides receiving a standard education, students have a chance to see the real professional environment in the process of internships. Internships are generally done in the 12th grade. It is declared in the website of the Ministry of National Education that students continue their education two days in school and three days in the working place suitable to their profession (Ticaret ve Turizm Öğretimi Genel Müdürlüğü, 2010). Working places present students a chance to learn from people who have worked in that profession for many years. Furthermore, students can improve their skills by carrying out small responsibilities suitable to their ages and competence. After finishing the program successfully, students receive a certificate which shows they are proficient in their chosen profession. As well as having a certificate, students can take a university entrance exam to continue their education at a university related to their professions (Ticaret ve Turizm Öğretimi Genel Müdürlüğü, 2010).

Knowing student profiles in vocational high schools is important to understand their situation and helping them to improve the quality of education in these schools. Ages of students are between 14 and 23 years old (Çetinkaya, 2010). Furthermore, Çetinkaya (2010) stated that 43.3% of students in trade high schools wanted to choose the department of accounting and financing to specialize in at the end of the ninth grade.

Problem

The literature shows that there has been a wide range of studies about motivation, its types, goal theory, and relationship between goal orientations and intrinsic vs. extrinsic motivation. Moreover, great numbers of researchers have investigated the impact of goal orientations on students' learning, behaviors and attitudes towards lessons (Lau & Lee, 2008; Lee et.al., 2010; Lin, 1997; Mattern, 2005). Together with these, raising the awareness about the importance of mathematics in vocational high schools is a new issue about which new studies have been conducted (Anderson, 2008; Drage, 2009; Mohr, 2008; Super, 1976). Since the foundation of vocational high schools in Turkey, many studies have been conducted about the objectives and standards of curriculum, developing the quality as well as remedying the deficiencies of education (Aytaş et. al., 2000; Demir et. al., 1997; METARGEM, 1995; Yörük et al., 2002).

As it was discussed earlier, students in vocational high schools have two options for their lives after graduation from these types of schools (Ticaret ve Turizm Öğretimi Genel Müdürlüğü, 2010). One of them is to go out to work right after finishing high school, whereas the other is continuing their education in university. It is a well-known fact that the scores from students of vocational high schools on the university

entrance exams are low; it is close to the lowest (Kenar, 2010). It is also known that one of the reasons for this situation is student failure in mathematics because they do not like it and are not conscious of the importance of mathematics which is a kind of motivational problem (Usul et. al., 2007). Reasons for this situation should be investigated. Besides, the motivation and goal orientations of these students have not been studied, so there is a gap in the literature. Hence, this study focused on motivational issues and students' goals in the trade vocational high schools in Ankara.

Purpose

The primary aim of the study was to describe types and factors of motivation of trade vocational high school students as perceived by their mathematics teachers. Hence, there are no previous studies on this issue; an exploratory mixed method was used in the study. Initially, an interview was used to gather mathematics teachers' opinions on the topic. After analyzing interview data, a survey was developed based on the interview. It helped to collect teachers' opinions about their students and provided data about their motives to study, their profile and their problems. Besides, the appropriateness of mathematic curriculum in regard to students' professional needs, profiles, and the goals, as well as explanations for the place and role of these goals in motivational factors.

Research questions

The main question of the present study is: What are the factors that affect the motivation of trade vocational high school students towards mathematics as perceived by their mathematics teachers?

In the light of this question, the following sub questions were investigated:

- What is the common type of motivation of students in trade vocational high schools?
- What are the sources of students' motivation in trade vocational high schools, if any?
- What are the possible motivational problems of students in trade vocational high schools?
- Is mathematics curriculum appropriate to students in trade vocational high schools and does it satisfy students' professional needs?

Significance

Indicating factors that affect motivation (such as grades, University Entrance Exam or high regard from teachers), determining types of motivation (intrinsic vs. extrinsic), describing effects of goal orientations and future goals of students in trade vocational high schools will bring attention toward trade vocational high schools' students, their situation, and possible reasons of lack of motivation and goals.

Therefore, this study is essential for educators, teachers and curriculum developers in order to find possible solutions for students motivation and improving the quality of education in trade vocational high schools in Turkey.

Definition of key terms

Motivation is the word that describes the internal and external factors that direct one's attention, curiosity and efforts towards lessons (H.-S. Chen, 2008). Also, motivation could be described as "related to wonder, interest and competition as well as fundamental human needs" (Çakmak & Ercan, 2003, p. 31). Maslow stated that

the positive theory of motivation should be to satisfy the basic needs of humans which are classified as biological and physiological needs, safety needs, belongingness and love needs, esteem needs and self-actualization needs initially (Maslow, 1970). Furthermore, he claimed that teachers should pay attention to meet the basic needs of individuals before trying to motivate students. It is easy to say that for example if an individual is hungry, the only thing that is on his or her mind is the hunger. The effort for motivation is not relevant in their situation.

Motivation could be categorized into various types and one of them is classifying it in terms of intrinsic and extrinsic motivation. Motivation is meaningful when it comes from inside. It could be considered as intrinsic motivation. Furthermore, intrinsic motivation is defined as “doing of an activity for its inherent satisfactions rather than for some separable consequence” (Ryan & Deci, 2000, p. 56). It is clear that students tend to perform tasks and activities, or to enjoy a lesson because of their own interests instead of being awarded or satisfying somebody else. Creating such a motivation could be hard task for inexperienced teachers.

On the contrary, extrinsic motivation is more about the external world. “Extrinsic motivation is a construct that pertains whenever an activity is done in order to attain some separable outcome” (Ryan & Deci, 2000, p. 60). Extrinsic motivation is a kind of motivation that emerges as a result of effects coming from outside such as teachers or parents (Çakmak & Ercan, 2003). Students who are extrinsically motivated study, complete tasks, and do activities for the sake of rewards. These students worry punishments or embarrassments in front of the class if any of their responsibilities is not completed (D. Stipek, 1998). Different from the intrinsic motivation, the effectiveness of extrinsic motivation does not last long. The

happiness of being successful could end easily if the reward is not given, or the external thing that motivates students disappears.

Another important definition for the study is the definition of the goal orientation theory. The goal orientation theory could be described as set of beliefs that determine reasons and ways of students' approaches and engagements towards learning activities (McCollum & Kajs, 2007). For instance, it investigates the reasons of a student who is trying to have an 'A' score on a lesson. One of the reasons could be appearing better than other students in classroom. This type of goal orientation is called as '*performance goal orientation*' (Pintrich, 2000). Besides, Pintrich (2000) said that in performance goal orientation, students study much in order to gain favorable judgments from others such as teachers, parents and friends.

Therefore, performance goal orientation could be described as "focus on demonstrating competence, being superior to others, and the use of social comparison standards" (Lau & Lee, 2008, p. 362). Another reason of studying for an 'A' in the example above is because of the desire to master the course content. This kind of orientation is defined as '*mastery goal orientation*' (McCollum & Kajs, 2007). "Mastery goals allow individuals to seek opportunities to increase their competence and master new challenges" (Mattern, 2005, p. 28). It is stated that students with mastery goal orientation study hard to improve their skills and learn the topic as much as possible for the sake of learning (Wolters, 2004).

Trade vocational high school is a kind of vocational and technical high school. It includes programs of accounting and financing, retail and marketing, office management and secretarial services, information technologies, electric-electronic

technologies and transportation (Ticaret ve Turizm Öğretimi Genel Müdürlüğü, 2010). The primary aim of the school is to train qualified people who can work in public and private sectors. Together with gaining special skills and knowledge related to their department, it is intended to train students that they are able to adapt innovations, to communicate with others, and to sort out problems (Çetinkaya, 2010; Tonne, 1958).

An accounting and financing department is described as the common need of all working areas (METARGEM, 2011; Ticaret ve Turizm Öğretimi Genel Müdürlüğü, 2010). All working areas need to employ an accountant, since it is a legal obligation. Besides, accounting and financing is the department in which students are educated on how to sort, record, report, and analyze the financial documents of business as well as learn about accounting entries, foreign trade regulations and finance and exchange services (Ticaret ve Turizm Öğretimi Genel Müdürlüğü, 2010). It comprises computerized accounting, foreign trade, and finance and exchange service as branches (Çetinkaya, 2010; Ticaret ve Turizm Öğretimi Genel Müdürlüğü, 2010).

CHAPTER 2: REVIEW OF RELATED LITERATURE

Introduction

Mathematics is a subject in high school which some students have difficulty to understanding (Alagic, 2007; Allendoerfer, 1947; Stipek, 1998). Many students do not want to participate with or even listen to mathematics lectures. Many students in Turkey graduated from high schools with having little information about the importance of mathematics. Research studies claim that one of the reasons for this situation is due to the lack of motivation. Therefore, the aim of this literature review is to explain the importance of mathematics and motivation in mathematics classrooms.

This literature review gives information about types of motivation and their unique importance in education; the goal orientation theory and its types; and vocational and technical high schools in Turkey. The aims of this literature review show the differences and similarities of these issues and make some connections between them that would help readers to understand the problem. Even with many studies on the motivation as well as suggestions to improve it in classes, there is a lack of studies about vocational high schools in Turkey.

Motivation

Motivation is the summation of internal and external factors that affect students' behaviors, efforts, and curiosities towards lessons (Ormrod, 2008). In addition, motivation is the force that gets somebody going, keeps them going, and identifies where they are going (Areepattamannil et. al., 2011; Barkaukis et. al., 2008;

Boekaerts, Education, & Education, 2002; Chen, 2011; Dede, 2003; Deci et. al., 2001; Husman & Lens, 1999; Maehr & Midgley, 1991; Slavin, 2006; Stipek, 1998; D. J. Stipek et. al., 2001; Weiner, 1990; Wentzel & Wigfield, 2009). Furthermore, motivation is one of the components of learning that is also difficult to measure. For instance, a group of students are motivated to do tasks in the lesson. Although all of them seemed to be engaged with tasks, it is possible that all of them were not motivated to the same level. One of them may have been motivated more than another in the same group, or one of them may not have wanted to engage in tasks but he or she behaved as if motivated (Slavin, 2006).

Motivation has been one of the main concerns of educational psychologists from its inception. A great number of researchers have tried to find the reasons and incentives that make people move. The studies on motivation started with the behavioral approach (Boekaerts et. al., 2002; Jacobs & Newstead, 2000; Slavin, 2006; Stipek, 1998; Wentzel & Wigfield, 2009). One of the proponents of this approach was B. F. Skinner and researchers tried to identify different types of reinforcement or rewards (Lai, 2011). Behaviorists claims that behaviors which have been reinforced or rewarded in the past tend to continue longer than the ones without such reinforcements (Slavin, 2006). In the light of this approach, it could be assumed that all students would be engaged in the task, if the teacher rewarded them. But what if students do not care about the reward? What if students get bored with the same reward after the second success or getting rewarded exactly? Or how could a teacher find a reward that would motivate all students to the same degree?

Behaviorist learning theory did not explain motivation properly as well as not answering the questions on motivation. Therefore, new approaches like cognitive

behavior modification (CBM) were developed (Lai, 2011; Wentzel & Wigfield, 2009). The aim of this approach was to change a person's behaviors by 'manipulating cognitive processes' (Lai, 2011). Students started to take more responsibility in their own development in terms of learning, identifying their goals and learning strategies. It was believed that learning behaviors would keep going during this time, and transfer to 'new contexts' by giving students such a responsibility (Lai, 2011, Slavin, 2006). Also, students should be involved in the decisions about giving rewards based on whether they are deserved it or not. But research showed that some undesirable results like cheating to have good grades or to deserve reward emerged with this approach (Ali et al., 2011; Chen, 2011; Maehr & Midgley, 1991; Weiner, 1990; Wentzel & Wigfield, 2009).

After CBM, literature was shaped by the "belief that behavior is affected by cognition rather than the consequences of one's actions" (Lai, 2011, p.6). The research on this issue was gathered under three questions:

Can I do this task?

Do I want to do this task and why?

What do I have to do to success in this task?

Many motivational theories like self- efficacy theory, attribution theory, self-worth theory, expectancy-value theory, self-determination theory, self-regulation theory and the goal orientation theory have been developed in the light of these three questions and each of them contributed to understand the motivation deeply with different perspectives (Boekaerts et al., 2002; Jacobs & Newstead, 2000; Slavin, 2006; Sorensen, 2006; Stipek, 1998; Weiner, 1990; Wentzel & Wigfield, 2009). For instance, attribution theory aims to find reasons, explanations and excuses for

success and failure when people encounter with them (Slavin, 2006). All these theories have had contributions to the literature of motivation. Likewise, Bandura (1991) also emphasized the three theories of motivations that were attribution theory, expectancy-value theory, and goal orientation theory, more than others.

Motivation can be classified into three that are primary and secondary motives, situational and continuous motives and internal and external motives (Çakmak & Ercan, 2003). Primary motive can be explained as the physiological-based motives that cannot be learnt such as hunger, sex, and sleep, whereas secondary motives can be learnt or gained over time like power, and affiliation (Çakmak & Ercan, 2003). Moreover, situational and continue motives are explained as the results of a certain situation. However, they differ from the time that their effects last. Situational motives are temporary, whereas continue motives are permanent (Çakmak & Ercan, 2003). For example, the motive that makes a student study biology for an exam even though he does not like biology is an example of a situational motive, whereas the motive that makes a student study biology because he loves it is an example of continue motive. However, this literature review focused on the types of motivation that is internal and external motives that are also named as intrinsic and extrinsic motivation.

Maslow's hierarchy of needs theory

Among all theories that are mentioned in previous part, The Hierarchy of Needs Theory that was developed by Maslow is one of the most important motivational theories in education. His theory was emphasized as “the most holistic, dynamic” and explains the students' motivation best by many researchers who studied on motivation (Ray, 1992; Saeednia & Norr, 2010; Sengupta, 2011; Weinberg, 2011).

Maslow believed that “need gratification was the most important single principle underlying all human development and motivation” (Ray, 1992, p.7). He (Maslow, 1970) stated that the positive theory of motivation should satisfy the basic needs of humans which are classified as biological and physiological needs, safety needs, belongingness and love needs, esteem needs and self-actualization needs initially (Maslow, 1970). Maslow represented these needs in a pyramid in which physiological needs such as food, sleep, and water are at the base and self-actualization is on the top so means needs are arranged from basics to complex (see Figure 1). However, some researchers claimed that Maslow just identified the basic needs of people instead of forming a triangle which presents the needs of people in order (Saeednia & Norr, 2010; Sengupta, 2011). Besides, it is indicated that people could move on to the next step by meeting the need that they are at that time. However, that does not mean the needs in any level are completely isolable. The needs in the levels are regarded “as channels for all sorts of other needs as well” (Maslow, 1970, p.19). Hence, teachers should bear these in mind and initially pay more attention to meet students’ basic needs in order to make them ready for motivation for the lesson.



Figure 1. The hierarchy of needs (Best et. al., 2008)

Biological and Physiological needs are at the bottom of the triangle which are the basic needs of life. They could be explained as air, food, rest, sex, shelter and the need of sleep and sensory satisfaction. Weinberg (2011) gave the example of countries that suffer from poverty and hunger. He said that the effort on education in these countries is nonsense, since the only focus of individuals in that region is “the acquisition of food and shelter” (p. 17). It is easy to say that for example if an individual is hungry, the only thing that is on his or her mind is the hunger. Besides, students’ sensory organs need to work properly in order to start learning well.

Safety needs are the second one in the triangle and deal with the security of an individual. People must have a safety place like home in order to be relaxed and ready for an activity (Maslow, 1970; Ray, 1992). Furthermore, students need a sense of “stability and freedom from fear and anxiety” (Ray, 1992, p.8) in order to focus on a task, activity or content of the lesson. Research shows that students prefer a “consistent and orderly learning environment” (p.8) where the rules are fair and the same for each individual, and they feel safe and not threatened from anyone (Ames, 1992; Boekaerts et al., 2002; Church et. al., 2001; Maehr & Midgley, 1991; Maslow, 1970; Mucherah, 2008; Slavin, 2006; Stipek, 1998; Wentzel & Wigfield, 2009). The level of motivation is decreased if students feel threatened, and hope to avoid punishments.

The third step of needs in the triangle is belongingness and love needs. Students have a desire for affectionate relationships, being accepted as who they are, being a part of a group, and being respected (Ames, 1992; Church et al., 2001; Maslow, 1970; Weiner, 1990; Wentzel & Wigfield, 2009). Ray (1992) states that the needs of belongingness and affections are more common among schools nowadays since

students cannot get these needs met in their home or elsewhere in their lives. As opposed to popular beliefs, these needs are a major factor of learning through all school years instead of just primary or middle school (Maslow, 1970; Ray, 1992). Besides, teachers should realize that students whose belongingness and love needs are not met in the school are more likely to seek attention by misbehaving in classrooms (Maslow, 1970; Ray, 1992; Weinberg; 2011).

The need of esteem could be divided into two as self-respect and respect from others (Maslow, 1970; Ray, 1992; Weinberg; 2011). Self-respect is the inner desire of competence, strength and achievement it is the thought of an individual itself. Students should believe in their own strengths before starting a task or activity in order to be successful. The second one is related with others' opinions, esteem and respect. Peers of the individual should respect and believe in the success of the individual and tell their opinions to him or her. Afterwards, students' self-esteems are enhanced with others' recognition, and attention. These would help their success. Moreover, Ray (1992) said in the first type of esteem needs is much more important for students to be motivated than the second one. It also helps to develop strong characteristics.

A self-actualization need is expressed as the desire of people to fulfill their needs. Also, self-actualization can be described as having "fulfilled physiological needs and psychological or growth needs and can 1) begin fully living one's real self, 2) labor toward fulfilling one's life mission and potential, and 3) conduct themselves with the character and characteristics of a fully mature human being" (Weinberg, 2011, p.19). After reaching self-actualization, students can also reach their potential and see what they are capable of achieving. For example, students at this level try to push their

limits, prefer challenging tasks and are more motivated if they succeed these challenging tasks.

Maslow stated that people start to develop a more powerful and strong character that resist difficulties of life and “future or present thwarting of the needs” (Saeednia & Norr, 2010, p.96) if they have been satisfied in the basic needs during their lives especially in the earlier ages (Maslow, 1970; Saeednia & Norr, 2010). He also mentioned that meeting higher needs like esteem are not related to getting older directly. This means people in their early years could achieve their self-actualization needs whereas an older person could not even meet their esteem needs yet. However, Maslow believed that every person even the least intelligence one could reach self-actualization by the age of four (Maslow, 1970; Saeednia & Norr, 2010).

Attribution theory

Attribution theory aims to understand the explanations and excuses of students after they have encountered the success and failure (Slavin, 2006; Wentzel & Wigfield, 2009). For example, a successful student had a low grade in one of the exams in a certain course. This low grade was not suitable to her self-image so it disturbed her. It resulted in disequilibrium and she could try some ways to overcome this disruption. One of them is studying more to decrease the possibility of getting low grades again. The second one is trying to rationalize her low grade. She could make excuses for her failure “The questions were very hard. I did not really try to answer the questions. Teacher did not tell us that we would have an exam. I was not feeling well.” These excuses could make her feel better. The aim of attribution theory is figuring out and classifying the excuses of failures or explanations of success (Weiner, 2000).

Three characteristics of explanations are suggested for success and failure by Slavin (Slavin, 2006). The first one is whether the cause is considered as internal or external. The second one is whether the cause is seen as stable or unstable. The third one is either the cause is controllable or uncontrollable. The attribution theory assumes that people endeavor to maintain a positive self-image (Bandura, 1991). Therefore, people tend to believe that success is because of their own ability and efforts, whereas they consider failure is originated from external reasons such as luck or task difficulty which could not be controlled by them. It has been shown that a group of people were all given the same exam; they scored the same proficiency rating, but they were told different results (Weiner, 2000). People who were told they had failed blamed the failure on bad luck, whereas the people who were told they had succeeded felt their abilities and intelligence were the cause.

Attribution theory mainly deals with four explanations for success and failure that are “ability, effort, task difficulty and luck” (Slavin, 2006; Wentzel & Wigfield, 2009). Ability and effort attributions are considered as internal and are directly related to the individual, whereas luck and task difficulty attributions are external and are directly related to outside the individual (Boekaerts et al., 2002; Maehr & Midgley, 1991; Slavin, 2006; Stipek, 1998; Weiner, 1990; Zhu & Leung, 2010). In the light of stability, ability and task difficulty are stable; whereas effort and luck are regarded as unstable attributions. Moreover, ability and effort attributions are considered as controllable, while luck and task difficulty are seen as uncontrollable (Jacobs & Newstead, 2000; Slavin, 2006; D. Stipek, 1998; Yanguas, 2010).

According to Attribution Theory, students’ explanations about failure vary in accordance with persistence of it (Slavin, 2006; Stipek, 1998; Weiner, 2000; Wentzel

& Wigfield, 2009). Students tend to attribute their failure to unstable reasons in order to preserve their identity. For instance, bad luck could be one of the reasons of failure. Also, students could tell that they did not really try hard to achieve. If being unsuccessful is repeated more than three times, the unstable reasons become unconvincing for both students and others (Jacobs & Newstead, 2000; Weiner, 2000). Being unlucky for a sustained period of time causes students to switch from unstable reasons to stable. The difficulty of the lessons could be the reason for some students' failure. As a result, students could consider that they do not have ability for the lessons which could destroy their self-esteem (Slavin, 2006; Weiner, 1990; Weiner, 2000; Wentzel & Wigfield, 2009).

What are intrinsic and extrinsic motivations?

Intrinsic and extrinsic motivations are one of the types of motivation described in the literature. Many researchers have studied the distinction between intrinsic and extrinsic motivation and the benefits of them in education. Intrinsic motivation can be described as “emerging as a result of the effects from inside, such as interest, wonder, needs, etc” (Çakmak & Ercan, 2003, p. 32). Raffini (1996, p. 3) states “ the desire to seek and conquer are at the heart of intrinsic motivation” In this type of motivation students do their tasks or activities because of their interest and curiosity of the subject. For instance, if a student is motivated internally, he or she could study physics before someone tells him or her to do it (Barkaukis et al., 2008; Berger & Karabenick, 2011; Çakmak & Ercan, 2003; Dede, 2003; Hayenga & Corpus, 2010; Husman & Lens, 1999; Kover & Worrell, 2010; Weiner, 1990). Besides, students with intrinsic motivation have two basic goals 1) the desire to achieve 2) the will to learn and study hard (Deci et. al.,2001; Hayenga & Corpus, 2010; Jacobs & Newstead, 2000; Wentzel & Wigfield, 2009).

On the other hand, Lei (Lei, 2010, p. 4) describes extrinsic motivation as “the sum of recognition, grades, rewards and competition in learning.” Students who are extrinsically motivated study, complete tasks, and do activities for external reasons such as the sake of rewards, to avoid punishments that would be given if their works was not completed, or not being ashamed in front of the class (Ali et al., 2011; Areepattamannil et. al., 2011; Best et al., 2008; Hayenga & Corpus, 2010; Kover & Worrell, 2010; Ryan & Deci, 2000). For example, students with extrinsic motivation study hard to do well on a test because if they are successful, their parents will buy them a brand new car as a reward for that success. Hence, the motive behind the study is not obtaining knowledge but reaping a reward (Shia, 2004). Besides, exam-based education system is found as one of the cause of extrinsic motivation (Wentzel & Wigfield, 2009). Nicholls claimed that exams give rise to social comparison among students which remove students from intrinsic motives (as cited in Wentzel & Wigfield, 2009). Since the Turkish education system has many exams to enter high school or university, it could raise extrinsic motivation among students. Different from the intrinsic motivation, the effectiveness of extrinsic motivation does not last long. The happiness of being successful could end easily if the reward is not given, or the external motives disappear.

Many researchers claimed that students who are intrinsically motivated tend to choose difficult and new tasks to learn new knowledge and more likely to exercise the tasks or topics independently rather than rely on their teachers (Ames, 1992; Lai et al., 2006; Mucherah, 2008; Pintrich, 2000; Tanaka & Yamauchi, 2001).

Amabile (1985) tried to test her hypothesis that people who are motivated intrinsically are more creative than others who motivated by external reasons. She

worked with 72 adults and made them write 2 poems so as to prove the hypothesis which claimed that creativity could be enhanced by intrinsic motivation. All participants wrote a poem and after that participants were divided into three groups as control, intrinsically oriented and extrinsically oriented by completing questionnaires according to their groups (control groups were not given questionnaires). Then, all participants wrote the second poems and successful poets scored them. The results showed that although there was no difference between the first poems in terms of creativity, the second poems of the control and intrinsic group were given higher points in terms of creativity (Amabile, 1985).

A great number of researchers have studied to demonstrate that extrinsic incentives like rewards, punishment, money and reputation undermine intrinsic motivation (Amabile et. al., 2005; Areepattamannil et al., 2011; Hayenga & Corpus, 2010; Jacobs & Newstead, 2000; Lei, 2010; Ryan & Deci, 2000; Slavin, 2006; Sorensen, 2006; Stipek, 1998; Weiner, 1990; Wentzel & Wigfield, 2009). Using punishments and rewards in lessons could undermine intrinsic motivation since internalization of the knowledge is reduced (Raffini, 1996, p.63).

Raffini (1996) is one of the researchers who explained the situation by giving a great example of it. Some boys were playing heavy metal and making much noise in the park that was close to the house of one of the famous professors of psychology. The professor was annoyed with them and started to think of ways that would send the boys away from the garden. He considered four ways: (1) requesting them to move to another part of the park, (2) buying larger speakers and “blasting out his enemies” by playing a different kind of music that boys would not like, (3) threatening them to call the police if they do not stop making noise, and (4) offering to pay each boy

amount of money if they would leave there and never return. However, none of the options seemed to be a solution to professor. Because he knew that requests are easily denied, playing another type of music would disturb others as well, threatening could cause fights and paying them to stop behavior would encourage them to start again. Therefore he found a fifth option and began to apply it the next day. He went near boys at the time they were preparing to leave for that day and told them that he really loved the music they played and enjoyed the noise that they made. He offered to pay them money if they would come there the next day and play music. The boys were glad and they played music in the same park as professor told them. Then the professor started paying them the money but the amount of it was decreasing day by day. At the fifth day, the professor told boys that he could not pay them again. The boys were angry and told him that they were not going to make music and noise without being paid. So, the professor never heard the noise that the boys made again. This example showed that external incentives could impress the behavior which is done because of intrinsic incentives. These boys were playing their music since they loved it, but their pleasure was damaged by the external manipulation and they stopped playing the music.

Psychologists, researchers and educators claim that young students are intrinsically motivated to learn (Deci et. al., 2001; Maehr & Midgley, 1991; Ryan & Deci, 2000; Stipek, 1998). Parents and teachers of these young learners rarely complain about the low motivation of their child or students to learn (Raffini, 1996). They have never-ending energy and curiosity to learn, explore and acquire the knowledge or skills that interest them. As an illustration, a small child could spend hours overcoming challenges such as opening the door, “getting out of a crib” or climbing up a crib

(Goh, 1998; Raffini, 1996). The level of this intrinsic motivation, curiosity and interest decreases gradually as students' progress through school.

The importance of motivation in classroom

One of the reasons of learning difficulties, classroom management problems and low grades is lack of motivation among classrooms (Akdemir, 2006; Ali et al., 2011; Ames, 1992; Areepattamannil et al., 2011; Çakmak & Ercan, 2003; Goh, 1998; Hayenga & Corpus, 2010; Maehr & Midgley, 1991; Slavin, 2006; Sorensen, 2006; Stipek, 1998; Turner et al., 2002; Weiner, 1990; Wentzel & Wigfield, 2009).

Students often develop negative attitudes towards lessons and school which decreased the pleasure derived from learning and they prevent themselves from attending activities and tasks during school days (Karaca, 2010). Hence, researchers say that the deficiency of motivation should be one of the important concerns that educators put emphasize on (Karaca, 2010).

Çakmak and Ercan (2003) claimed that motivation could be helpful for increasing students' participation in mathematics lesson. Their study described the motivation as a "prerequisite for effective learning, and the greatest challenge that many teachers face is to make their students want to learn" (p.32). In addition, some activities and suggestions such as creating a peaceful environment, giving immediate feedback, allowing students to select their task, and rewarding students' efforts are given as examples to increase students' motivation in order to create an effective teaching environment (p.37). They also mention that students who do not have a natural interest in mathematics need to be motivated by stimulated teaching methods and procedures (Sobel & Maletsky, 1999). In their book, Sobel and Maletsky give

activities, strategies, aids and opinions to the teachers who want to motivate or engage students in their lessons.

One of the reasons students' lack motivation is that they do not understand the importance of mathematics in real and professional life (Hyslop, 2008; Mohr, 2008; Scarpello, 2009). "When am I ever going to use this stuff?" is one of the questions that teachers encounter often in mathematics classes. It is recommended that real life problems that could be solved by mathematics, history of mathematics, information of the usage of some topics in professional life are mentioned in classes to increase students' motivation by arousing their curiosity and making them interested (National Research Council Staff & Mathematical Sciences Educational Board, 1998). By the same token, for many decades, there have been many research studies to connect future careers with mathematics.

Ali and his colleagues (Ali et al., 2011) have investigated the impact of motivation towards mathematics lessons in a problem-based learning environment. They conducted an experimental study with experimental and control group to check the effect of motivation on students' academic achievement at the elementary level. The experimental group learnt the lessons with many motivational techniques like discussion in groups, quizzes, projects, whereas teachers in the control group taught lessons traditionally. The result showed that motivation is more effective in mathematics lessons using problem based learning rather than in traditional methods not only for high achievers but also for low achievers (p. 306-308).

The goal orientation theory as motivational theory

Since achievement is generally ensured from motivation, researchers focus on the motivation. Researchers have contributed many valuable motivational theories into the literature. So, the goal orientation theory (also known as the goal theory) is one of the well-known motivational theories that is recently used in the educational area (Wentzel & Wigfield, 2009). Goal is defined as “the end towards which effort is directed” (Was, 2006, p. 531). The goals evoke students’ curiosity and make students study hard to accomplish their goals. The goal orientation theory is a form of *Achievement Goal Theory* which was developed by Carol Ames, Carol Dweck, Marthy, Maehr, and John Nicholls collaboratively in the 1970s (Elliot, 2005). Researchers were influenced by three major motivational frameworks which are *Attribution Theory*, *Social-cognitive Theory*, and *Achievement Motive Theory* (Slavin, 2006; Wentzel & Wigfield, 2009). Founders of goal orientation theory were mostly influenced by the *Attribution Theory*.

The *Achievement Motivation* was founded by McClelland and his colleagues in 1953 and it was defined as “To accomplish difficult tasks, overcoming obstacles and becoming expert” (Remedios & McLellan, 2009, p.3), Dweck and her colleagues began to discuss the reasons which made individuals endeavor to achieve. During their study, Dweck and Nicholls realized that school age children with equal ability reacted differently to the failure in tasks (Elliot, 2005, p.53). For instance, while one group of the students persisted with the tasks, another group of students showed negative attitude towards tasks and told that they did not like these types of tasks (Remedios & McLellan, 2009). Therefore, Dweck claimed that if the same tasks were given to pupils, “some of pupils were striving to demonstrate competence (performance approaches) while others were simply trying to develop mastery and

competence at the task (mastery approaches)” (Remedios & McLellan, 2009, p.4).

So, achievement goal began taking place in the literature of motivation.

The question of ‘where do goals come from?’ is one of the main questions of the goal orientation theory and goal theorists have been trying to figure out the question from the foundation of the goal orientation theory (Elliot, 2005; Phan, 2008; Slavin, 2006; D. Stipek, 1998; Wentzel & Wigfield, 2009). There are some various opinions about the origins of the goals. Researchers such as Dweck and Pintrich claimed that achievement goals come from the person, whereas researchers such as Ames asserted that goals come from the situation. Also, studies of Nicholls and Maehr claimed that achievement goals have the origin of both person and situation (Wentzel & Wigfield, 2009).

The aim of the goal orientation theory is to explain reasons, purposes, and ways of achieving objectives, rather than focusing on the objectives (Kaplan & Maehr, 2007). It provides a framework for research of environmental and internal factors that enhance motivations (Kaplan & Maehr, 2007). The goal theorists claim that there is a relationship between beliefs (goal orientations) and efforts in lessons, activities and tasks (D. Stipek, 1998).

Goal orientations are divided into three categories: (1) learning and performance goals, (2) task involvement and ego involvement goals, and (3) mastery and performance goals (Kaplan & Maehr, 2007). This literature review concentrated on mastery and performance goal orientation that Ames (Ames, 1992) gave the names of them.

Mastery versus performance goal orientations

Goal theorists have mainly studied on mastery and performance goal orientations.

Mastery goal orientation can be also found as task- orientation and learning goal orientation in the literature. It is a type of goal orientation that students focus on comprehending the knowledge of disciplines in order to learn it because of its positive outcomes in the future (Ames, 1992; Covington, 2000; Pintrich, 2000). Students with mastery goal orientation study the lesson and do their tasks for the sake of learning (Lin, 1997). Furthermore, students with mastery goal orientation keep in the mind the questions of “How can I understand this?” or “How can I master this task?” during their study (Lin, 1997).

Studies on mastery goal orientation found that there is a correlation between mastery goal orientation and having effective learning strategies, “using of deep cognitive process” (Shia, 2004, p.2), choosing difficult and challenging tasks, and having positive attitude towards lessons and schools (; Lin, 1997;; Wentzel & Wigfield, 2009). Besides, mastery goal orientation is also correlated with consideration of outcomes in the future. Students with mastery goals study for both the present and the future (Lai, 2011; Phan, 2008). One of the aims of students with mastery goal orientation is to learn the topic deeply and to master skills that are beneficial to their future such as their professional lives (Ames & Archer, 1988; Keys et. al., 2012).

Students with mastery goal orientation know how to benefit from their mistakes (Elliot, 2005; Lai, 2011). They consider errors and mistakes as a natural part of learning (Bandura & Schunk, 1881). Students try to figure out why they made mistakes and how to recover from them. According to them, the important thing is to figure out the mistake and not repeat it (Ames, 1992). Therefore, mastery oriented

students tend to enjoy and feel confident in mathematics lessons, since making inferences from their mistakes helps them to reach the best solution (Ames, 1992; Bandura & Schunk, 1981; Lai, 2011).

In contrast with mastery goal orientation, performance goal orientation means showing potential of capacities and competences to others (Kaplan & Maehr, 2007). Hence, performance goal orientation is also known as the ego-goal in literature. Performance oriented students focus on learning because of their desire to show themselves to their friends and teachers and their desire to rank first in the competitions among classroom (Ames, 1992; Covington, 2000; House, 1971; Pintrich, 2000). Although students with performance goal do not like the lesson, they engage with lessons so as to surpass their peers. Besides, the questions of students with performance orientation goals are ‘Will I look smart?’ and ‘Will I outperform others?’ (Ames, 1992; Lai, 2011).

A large amount of research has demonstrated that students with mastery goals tend to learn and evaluate the materials so as to improve their own previous performance, whereas students with performance goals tend to outperform others (Covington, 2000; Lau & Lee, 2008; Lin, 1997). Bandura (1991) described the intelligence of people with mastery goal orientations as being incremental, whereas described the intelligence of performance oriented students as being stable. Thus, Lai and his colleagues (2006) claimed that performance goal orientation is significantly related to deep and surface strategies for learning, while mastery goal orientation is just related to deep learning strategies. Performance oriented students generally use surface strategies just for remembering the knowledge; they rarely use deeper strategies in order to comprehend what they learn. On the other hand, mastery

oriented students usually use deeper learning strategies to internalize the knowledge and find possible ways to apply them (Shia, 2004).

There is a consensus among traditional goal theorists that mastery goal orientation facilitates students' learning, whereas performance goal orientation does not (Ames, 1992; Ames & Archer, 1988; Elliot, 2005; Mattern, 2005; Wentzel & Wigfield, 2009). In other words, performance and mastery goals are considered as two contrasting goal orientations; mastery goal is good, performance goal is bad.

Performance oriented students tend to look for shortcuts in the learning process such as rote memorization that undermine learning. However, a study by Lau and Lee (2008) presented that students who pursue both mastery and performance goals perceive a classroom environment positively and use more learning strategies than students with one goal. Furthermore, it is argued that performance goals are more salient for college students than mastery goals since performance pressures and social comparison are the best ways to operate students' higher levels of learning (Lau & Lee, 2008). Because drawing students' interests to all tasks is insubstantial. Hence, performance goals could be also regarded as adaptive for students' learning.

Many researchers have found that mastery goal orientation is related to interest and curiosity. Therefore, mastery goal orientation is related to intrinsic motivation. On the contrary, performance goal orientation is associated with performance and external motives so that it is related to extrinsic motivation (Chyung et. al., 2010; Lau & Lee, 2008; Lee et al., 2010). Lee and colleagues (2010) examined the relationships between future goals and achievement goal orientations among Singapore secondary school students. They conducted a survey with 5,773 students chosen from 13 secondary schools in order to understand "how Singaporean

students' values and motivations are related to their learning and academic performance" (Lee et al., 2010, p.1). Results showed that there appeared to be a clear connection between mastery goals and intrinsic motivation as well as performance goals and extrinsic motivation (Lee et al., 2010).

Previous studies showed that there is a strong relationship between classroom climate and students goals (Ames, 1992; Ames & Archer, 1988; Keys et al., 2012; Lin, 1997; Meece et. al., 2006; Mucherah, 2008; Phan, 2008; Slavin, 2006; Tapola & Niemivirta, 2010; Wentzel & Wigfield, 2009; Wolters, 2004). Classroom climate affects students' perceptions, and influences students' outcomes so classroom climate has a great role on setting goals of students unwittingly. Table 1 represented differences of goals in classroom climate. Students who perceived their classroom environment as supportive tend to develop mastery goals for themselves, while students who perceived their classroom environment performance based tend to develop performance goals (Ames, 1992; Ames & Archer, 1988). For instance, students whose classrooms are based on mastery goals tend to choose challenging tasks in order to develop their skills; while students in performance goals classrooms tend to choose easy tasks in order to accomplish them immediately. Furthermore, students who perceived their classroom environment as mastery oriented attributed their success to their efforts, whereas the failure was perceived as a lack of ability by students in performance oriented classrooms (Ames & Archer, 1988; Church et al., 2001; Tapola & Niemivirta, 2010).

Goals are not associated with intelligence. In other words, mastery goal oriented students are not more intelligent than students with performance goals or vice versa (Elliot, 2005; Slavin, 2006; Wentzel & Wigfield, 2009). However, their classroom

performance differs substantially (Ames & Archer, 1988; Pintrich, 2000; Slavin, 2006). As an illustration, teachers could distinguish students with performance goals and mastery goals easily when students have obstacles in the classroom. Performance oriented students become discouraged, their motivation decrease, and tasks make them anxious. On the other hand, mastery oriented students keep trying, their motivation increase as well as their performance (Bandura & Schunk, 1981). Thus, students with mastery goal orientation tend to choose challenging tasks, whereas performance oriented students are more likely to select tasks that they know how to accomplish (Bandura & Schunk, 1981; Lai, 2011).

Table 1
The goal analysis of classroom climate (Ames & Archer, 1988)

| Climate Dimensions | Mastery Goal | Performance Goal |
|--------------------------|---------------------------|--|
| Success defined as | Improvement, progress | High grades, high normative performance |
| Value placed on | Effort, learning | Normatively high ability |
| Reasons for satisfaction | Working hard, challenge | Doing better than others |
| Teacher oriented toward | How students are learning | How students are performing |
| View of errors/mistakes | Part of learning | Anxiety eliciting |
| Focus on attention | Process of learning | Own performance relative to others |
| Reasons for effort | Learning something new | High grades, performing better than others |
| Evaluation criteria | Absolute progress | Normative |

Approach and avoidance goals

Studies on achievement goal theory are gathered under three categories: two-goal model, three-goal model, and four-goal model (Ames, 1992; Boekaerts et al., 2002; Elliot, 2005; Elliot & Church, 1997; Pintrich, 2000; Tanaka & Yamauchi, 2001; Weiner, 1990; Wentzel & Wigfield, 2009). The two-goal model is the first

achievement goal theory. It was founded by Ames, Nicholls and Maehr and it consisted of mastery-oriented goals and performance-oriented goals (Elliot, 2005; Elliot & Church, 1997; Pintrich et. al., 2003; Stipek, 1998; Wentzel & Wigfield, 2009). According to researchers the two-goal model, mastery goal orientation is beneficial, whereas performance goal orientation is inimical to learning (Elliot, 2006; Keys et al., 2012). On the other hand, other researchers had some doubts on performance goals and they conducted research to analyze the benefits of performance goals on learning (Elliot & Sheldon, 1997; Keys et al., 2012). The situation led to more studies on goal theory and developed multiple goal models.

Three-goal model and four-goal model are examined in multiple goal models which claimed that students could adopt more than one goal at a certain time (Wentzel & Wigfield, 2009). Three and four-goal models were influenced by Dweck's definition of the two-goal model which includes positive and negative judgments together.

Dweck defines the performance goal as "individuals seeking to maintain positive judgments of their abilities and avoiding negative judgments by seeking to prove, validate or document their abilities and not discredit it" (Elliott & Dweck, 1988, p.645). The negative judgments led researchers to find the third goal which is the performance avoidance goal. The definition of it can be explained as the goal whose aim is avoiding unfavorable outcomes of failure (Boekaerts et al., 2002; Elliot, 2005; Elliot & Church, 1997; Harackiewicz & Linnenbrink, 2005; Pintrich, 2000; Weiner, 1990; Wentzel & Wigfield, 2009). In this orientation, students study so as not to appear incompetent, unwise to others or under the normative standards in terms of success (Elliot, 2005; Elliot & Sheldon, 1997; Mucherah, 2008). The main aim of

this type of students is being at the same level of intelligence, skills and competences other students in the classroom instead of learning the topic or mastering the task.

Elliott and Harackiewicz conducted two experiments to define and test the effects of performance avoidance goals (Wentzel & Wigfield, 2009). Experiments were based on projects to solve puzzles and participants were college students. The aim of solving puzzles was described to participants in three perspectives as performance approach, performance avoidance and mastery goals. The aim of solving the puzzles was described as “to compare college students to one another in their ability to solve hidden figure puzzles” in both performance goal perspectives (Elliott & Harackiewicz, 1996, p.179). They explained the potential benefits of the project as giving students the opportunity to show that *a participant as a good puzzle solver* in terms of performance approach goal, whereas the benefit of the project was told as giving the opportunity to a participant to show that *he or she is not a poor puzzle solver* in performance avoidance goal. Furthermore, the results of the both performance goals would be declared in the ascending order of students.

On the other hand, the purpose of the project was to “collect data on college students’ reactions to hidden figure puzzles” (Elliott & Harackiewicz, 1996, p.179) in the mastery goal orientation part and the results of it would be given as the percentage of total hidden pieces of puzzles that a participant found. After the experiment finished, participants completed the self-report surveys that measured “the need for achievement, fear of failure, and competence expectancies”. Its results showed as mastery goals were related to a need for achievement and high competence expectancies, performance approach goals were related to a fear of failure and high competence expectancies, whereas performance avoidance goals

were related to fear of failure and low competence expectancies (Elliott & Harackiewicz, 1996, p.179).

Elliot and Harackiewicz claimed that (1996, p. 179) “Self-esteem was positively related to performance approach goal and mastery goal, whereas it was negatively related to performance avoidance goals”. Hence, students with performance avoidance goals generally suffer from problems which are the results of low self-esteem. Besides, students with mastery or performance avoidance goals have higher level of anxiety, whereas students with just performance avoidance goals also have lower level of interest, ability and achievement (Elliott& Church, 1997; Pintrich, 2000; Wolters, 2004). These two statements combine higher levels of anxiety lead to low self-esteem (Slavin, 2006). Since the main source of anxiety is the “fear of failure” (Slavin, 2006, p.333), low-achiever students tend to be more anxious than other students in the same class and that is one of the reasons of low self-esteem.

There are numerous studies that claim performance oriented goals (especially avoidance) are detrimental to learning and intrinsic motivation (Ames & Archer, 1988; Elliot, 2005; Keys et al., 2012; Pintrich, 2000). Since the aims of students are to demonstrate their capabilities in a group of people or to avoid seeming incompetent, the important outcomes of learning are ignored and people spend minimal effort to learn something (Keys et al., 2012; Tapola & Niemivirta, 2010; Webb & Sheeran, 2005). Moreover, people with performance goals tend to have rote learning strategies and their retention period of knowledge lasts until the exams end (Elliot, 1999; Keys et al., 2012; McCollum & Kajs, 2007). Besides, it was shown that students with performance goals (both avoidance and approach) are less likely to seek help from their peers or teachers in the classroom than students with mastery

goals (Meece et al., 2006; Turner et al., 2002). Demonstrating their capabilities to the others makes them perceive seeking help as the behavior of ones with low ability. Therefore, they avoid asking for help from others in order not to be seen as having problems with the activity, task or class work. Since the aim of students with a mastery goal orientation is to master and understand the task, activity or material used in class, they do not hesitate to seek help from others.

The differences between three-goal model and four-goal model (could be also found as 2x2 achievement goal conceptualization) is mastery avoidance goal. Some experiments and researchers suggested defining the fourth goal as mastery avoidance and defined it as the goal related to “self-referential or task-referential incompetence” (Elliot & Harackiewicz, 1996, p. 181). While mastery approach goals mean working to develop abilities, skills, and knowledge of a person, mastering the task and materials related to any lesson, mastery avoidance goals mean working in order not to lose abilities, skills or knowledge that one has already developed (Elliot, 1999; Elliot & Harackiewicz, 1996; Keys et al., 2012). Elliot gave the example of Michael Jordan to make the definition of mastery avoidance goal more concrete (Elliot & Harackiewicz, 1996). Michael Jordan is one of the most successful basketball players that come to mind. Like many successful players, he began losing his wonderful performance as a basketball player as his retirement time came closer. At that time, his mastery approach goal was replaced by mastery avoidance goal and he tried not to lose the abilities and performance that he had already developed (Boekaerts et al., 2002; Lai, 2011; Wentzel & Wigfield, 2009).

Vocational high schools in Turkey

Raising qualified generations who meet the technological and economic needs of countries and bringing innovations to them is one of the aims of education. After being educated for 8 years in primary schools, students are directed to high schools according to their career choices and future goals. Students have three options. One of these is regular high schools that prepare students for higher education like university. Moreover, regular high schools are comprised of eight different high schools that are regular, Anatolian, science, social sciences, Anatolian teacher, sports, Anatolian fine arts and multi-program high schools (Aytaş et al., 2000; METARGEM, 1995a; Tansel, 1998). The second one is vocational and technical high schools which prepare students not only for higher education but also for vocations. The last choice is vocational educational institutions like apprenticeship and vocational training that prepare students for professional life directly (Özcan, 2010). Students are needed to be guided one of these three options based on their skills, intelligence and interests (Özcan, 2010).

Vocational high schools are well accepted throughout the world since they train qualified people for specific work places (Aytaş et al., 2000; METARGEM, 1995a; Tansel, 1998; Yörük et al., 2002). Vocational education began in the 12th century in Turkey. Between the 12th century and the 18th century, people were educated by *Merchants and Craftsmen Organizations*. Until establishing the Republic, vocational education was given by Comprehensive Schools and special training centers (Nogay, 2007). To insure consistency in vocational education, each city established their own Comprehensive Schools and implemented their own instruction schedule (Nogay, 2007). After the foundation of the Turkish Republic, vocational education schools were governed by the *National Ministry of Education*. In the beginning, the National

Ministry of Education did not have central organization to govern vocational schools regularly. Nowadays, vocational schools are governed by the *Research and Development Center of Vocational and Technical Education (METARGEM)*. (Aytaş et al., 2000; Çetinkaya, 2010; Yörük et al., 2002). Currently, vocational high schools are classified in four groups such as vocational and technical high schools for boys, vocational technical high schools for girls, trade and tourism vocational high schools and İmam Hatip high schools (Demirli, Kazu, 2002).

Students who would like to receive decent vocational education should follow the following order (Gençtürk, 2006; Usul et. al., 2007; Yörük et. al., 2002). Initially, upon completion of primary schools, students should start vocational education in vocational and technical high schools. After graduation from vocational high schools, students would be able to continue to a related 2-year university with open admission that is without a need to pass a university exam. Also, students would be able to continue 4-year university in a related vocational department, if they so desire and be successfully passed the university entrance exam. Subsequent to finishing a 2-year university, students could complete their university education at a 4-year institute and achieve a bachelor's degree by taking an exam that is called *External Transfer Exam* (DGS in Turkish). The purpose of this procedure is to provide with students a strong background in any vocational department in any vocational high schools and to give them an opportunity to obtain higher education in order to train well-qualified generations (Demir et. al., 1997; Gençtürk, 2006; Usul et. al., 2007; Yörük et al., 2002).

Internship is one of the essential parts of vocational education that provides students develop their professional skills, learn professional standards, and values with the

help of their mentors (Aytaş et al., 2000; Demir et al., 1997; Usul et. al., 2007; Yörük et al., 2002). Internship is part of the 12th grade curriculum (Kenar, 2010; Usul et. al., 2007). Students attend vocational schools two days in a week and do internships in the remaining three days. In order to learn more about the profession, students are allowed to practice duties in their profession under the control of their mentors during their internships. Even though a internship is well-regulated, studies show that it is not adequate practice (Erol, 2004; Kenar, 2010; Usul et. al., 2007). According to Erol (2004), students attend internships only to fill time. They are not allowed to practice their skills sufficiently and are not paid enough attention by their mentors. Also, students claimed that the internship did not help them when they started their professional lives (METARGEM, 1996b). Kenar (2010) explained the reason of it as a lack of communication and collaboration between the schools and the work places.

Being eligible to attend university for the vocational and technical high school students is an ever-changing issue in Turkey (Aytaş et al., 2000; Çetinkaya, 2010; Ş. Demir et al., 1997; Yörük et al., 2002). Before 1980, students in the vocational high schools entered a university entrance exam that measured students' vocational knowledge and they were accepted by their related department (Nogay, 2007). Thereafter, the university entrance exam was changed and all students had to take the same exam in order to continue on to university. Questions were about general sciences that are mathematics, Turkish, sciences and social sciences and the vocational high schools' curriculum did not put much emphasize on these lessons (Gençtürk, 2006; Nogay, 2007; Yörük et. al., 2002). Furthermore, continuing at university for vocational high school students was restricted by a new arrangement of coefficients. After the new arrangement, students of regular high schools were able to attend departments related to vocational education easier than students of

vocational high schools (METARGEM, 1995a; Nogay, 2007; Yörük et al., 2002).

Allowing students to continue 2-year university without any exam in 2006 was the last change of attending university for vocational high schools' students (Çetinkaya, 2010; Usul et. al. 2007; Yörük et al., 2002).

The ever-changing arrangements for attending university has a negative effect on the students (Çetinkaya, 2010; Demir et al., 1997; Usul et. al., 2007). Vocational and technical high schools were no longer in demand after students only need to take general culture courses to pass the university entrance exam. Previous studies claim that vocational high schools are inadequate for preparing the students for the university entrance exam (Aytaş et al., 2000; Demir et al., 1997; METARGEM, 1996a; METARGEM,1996b; Nogay, 2007; Özcan, 2010; Tansel, 1998; Usul et. al., 2007; Yörük et al., 2002). Only in the ninth grade, the students are taught general culture courses intensively. Afterwards, vocational courses are taught in the 10th, 11th, and the 12th grade. Hence, the students insufficiently prepare to answer the questions correctly since they do not have enough background (Nogay, 2007). Additionally, the open admission to a 2-year university impairs the quality of the students in universities (Özcan, 2010). Most of the students considered open admission as providing a chance to have an associate diploma without studying hard. Hence, the students rarely develop professional skills (Gençtürk, 2006; Usul et. al., 2007). Also, open admission means postponing military service or losing the benefit derived from social status incurred from being university students (Gençtürk, 2006; Usul et. al., 2007).

Studies about the reasons of attending vocational and technical high schools showed that students start these schools compulsorily (Çetinkaya, 2010; Demir et al., 1997;

Demir & Subaşı, 2008; Özcan, 2010; Yörük et al., 2002). Successful students are directed to regular or Anatolian high schools by their parents and teachers. Students take an exam called high school entrance exam and attend Anatolian or regular high schools if they have satisfactory scores. After not being able to attend regular or Anatolian high schools, unsuccessful students are guided to vocational and technical high schools in order to have a profession (Demir & Subaşı, 2008; Usul et. al., 2007). Moreover, the students express the main reason for attending vocational high school as having a profession if they could not pass university entrance exam (Demir&Subaşı, 2008; Usul et. al., 2007). Since the monthly income of the majority of students is less than 500 TL (Çetinkaya, 2010; Özcan, 2010), the socio-economic situation was found as highly related to attending vocational and technical high schools. Students would like to take up a career and earn money upon completion of high school (Çetinkaya, 2010; Demir& Subaşı, 2008; Gençtürk, 2006; Özcan, 2010).

One of the main problems in the vocational high schools is undereducated students (Çetinkaya, 2010; Kenar, 2010; Özcan, 2010; Tonne, 1958; Usul et. al., 2007; Yörük et al., 2002). Çetinkaya (2010) stated that the students in vocational high schools have unsatisfactory primary school diploma grade, which is 2 out of 5. In other words, students hardly graduated from primary schools. Therefore, they do not have strong general course knowledge especially in mathematics. According to the teachers, the students do not have basic mathematics knowledge even they could not carry on basic operations without a calculator (Kenar, 2010). Undereducated students could not make up their insufficiencies and they graduated from vocational high schools with little knowledge (Demir & Subaşı, 2008; METARGEM, 1997; Kenar, 2010). Hence, the students give rise to serious quality problems in the working areas.

Another important issue about vocational high schools is insufficient guidance before the high school (Aytaş et al., 2000; METARGEM, 1997; METARGEM, 2003; Kenar, 2010; Özcan, 2010; Usul et. al., 2007; Yörük et al., 2002). Seventy percent of vocational high schools students stated that they did not receive guidance and counseling about vocational education before attending these schools (Kenar, 2010).

It is also stated that students have less or no information about their schools before starting (Aytaş et al., 2000). Together with these, research showed that the students are highly affected by their parents in terms of attending vocational and technical high schools (Çetinkaya, 2010; Nogay, 2007; Özcan, 2010). The students are directed to vocational education by their parents regardless of their skills and interests. Determining a profession by the parents could affect the students negatively in terms of showing interest to the profession (Usul et al. 2007). It could also decrease students' motivation towards lessons and make them complete the high school in order to satisfy the parents (Usul et al. 2007). Thus, studies recommended that the students and their parents should be guided about function, aims and importance of vocational education after the 6th grade. It could help to create awareness on the schools and train more qualified people (Aytaş et al., 2000; Çetinkaya, 2010; METARGEM, 1997; Kenar, 2010; Nogay, 2007; Özcan, 2010; Usul et. al., 2007).

Studies showed that the vocational and technical high schools are not as demanding as regular high schools in Turkey (Aytaş et al., 2000; Özcan, 2010; Yörük et al., 2002). The number of students in vocational high schools is gradually decreasing, whereas the number of students in regular high schools is increasing year by year. For instance, the number of students per regular schools was 609, while the number

of students per vocational and technical high schools was 294 in 2005 (Özcan, 2010). Furthermore, the number of students per teachers in the vocational high schools is higher than the number of students per teachers in regular high schools (Özcan, 2010). As a result, vocational and technical high schools are not in demand by students and the number of teachers in the vocational and technical high schools is small in comparison with regular high schools (Demir et al., 1997; Özcan, 2010; Tonne, 1958; Yörük et al., 2002).

The ever-changing university entrance exam regulations and insufficient guidance are two causes of the problem. Additionally, according to the research, students are not pleased to receive an education in vocational high schools (Gençtürk, 2006; Kenar, 2010; Usul et. al., 2007). Fifty eight percent of the students in vocational and technical high schools claimed that they would change their schools, if they had the opportunity (Kenar, 2010). Also, the majority of students do not recommend their schools to other students because of insufficient curriculum and problems in the university entrance exam (Aytaş et al., 2000; Gençtürk, 2006; Usul et. al., 2007; METARGEM, 2008).

Trade vocational high schools

Trade and vocational high schools are a type of vocational high school that are responsible for training qualified man power for the working areas of trade, finance, marketing, accounting, banking and secretaryship (Çetinkaya, 2010; Ticaret ve Turizm Öğretimi Genel Müdürlüğü, 2010; Yörük et al., 2002). Since it is a kind of vocational and technical high schools, the advantages, the problems and the research given in the previous part are all valid for them. Furthermore, the trade vocational high schools are four-year high schools and incorporate Accounting and Financing,

Retail and Marketing, Office Management and Secretaryship, Information Technologies, Electric-electronic Technologies and Transportation programs (Çetinkaya, 2010; METARGEM, 1996b). In this literature, the accounting and financing department was focused.

Studies on trade vocational high schools showed that vocational high schools are inadequate to prepare the students for their professional lives (Gençtürk, 2006; METARGEM, 1995b; METARGEM, 1996; Özcan, 2010). Both students and employers claimed that professional skills and knowledge of the students are not sufficient to improve their career. Also, according to the studies, employers generally prefer university graduates to high school graduates as employees (Demir & Subaşı, 2008; METARGEM, 1995b; Gençtürk, 2006). Research explained the reason of inadequate education is the lack of practice (Erol, 2004; Gençtürk, 2006; METARGEM, 1996b; Usul et. al., 2007). Internships which give opportunities to the students to learn by trying are not paid enough attention. Therefore, more than half of the graduated people do not have jobs (Gençtürk, 2006; METARGEM, 1995b; METARGEM, 1996b).

The department of accounting and financing

Accounting and Financing is the department where individuals gain competence for the working in the area of trade. Analyzing an assortment of documents, dealing with custom procedures and book keeping of business organization are examples of the main responsibilities in trade working area (METARGEM, 2011). The aim of the department is to raise qualified people in the light of scientific and technological progress in order to satisfy the needs of the business sector. Furthermore, the students do not need to have any specialty to attend the department. No special exam is

needed to be passed (Çetinkaya, 2010; METARGEM, 2011; Tonne, 1958; Yörük et al., 2002). Computerized accounting, foreign trade, and finance and exchange service are branches of accounting and financing department (Çetinkaya, 2010; METARGEM, 2011).

The accounting and financing department is designed as a four year program based on the international sufficiency of man power, the research of a trade sector and vocational competence (Ticaret ve Turizm Öğretimi Genel Müdürlüğü, 2010). The ninth grade curriculum includes general courses for all types of high schools (see Table 2). Moreover, courses in the 10th grade are general courses and common courses of a related department, whereas the 11th and the 12th grades include both the common courses of department and courses of a selected branch. After learning the general courses in the grade 9, the students decide on their department such as the department of accounting and financing in the 10th grade. At the end of the 10th grade, the students decide on which branch to continue such as computerized accounting, foreign trade, or finance and exchange service. The needs of the business sectors, the capacity of the physical environment and teachers, equipage of school, and competence of students are taken into consideration on the process of selecting a branch (METARGEM, 2011; Ticaret ve Turizm Genel Öğretim Müdürlüğü, 2010). Also, the students do their internship in the grade 12.

The studies on the accounting and financing department are generally related to students' profile, socio-economic and training level of their parents, pleasure of students about their department, students' points of views on accountancy, and desire of attending university (Çetinkaya, 2010; Demir & Subaşı, 2008; Özcan et. al., 2009; Usul et. al., 2007; Yörük et al., 2002). According to Demir and Subaşı (2008),

the monthly income of the parents is between 500 and 750 Turkish Liras as well as the great majority of parents are primary school graduates. Hence, trained and welfare parent do not allow their child to have an education in the trade vocational high schools (Çetinkaya, 2010; Demir&Subaşı, 2008; Özcan et. al., 2009).

Table 2
Curriculum of the accounting and financing department in trade and vocational high schools (weekly schedule in 2011-2012)

| Categories of courses | Courses | 9 th grade | 10 th grade | 11 th grade | 12 th grade |
|------------------------------|---|-----------------------|------------------------|------------------------|------------------------|
| Common courses | Language and expression | 2 | 2 | 2 | 2 |
| | Turkish literature | 3 | 3 | 3 | 3 |
| | Education of religion and ethics | 1 | 1 | 1 | 1 |
| | History | 2 | 2 | - | - |
| | Revolution history and Kemalism | - | - | 2 | - |
| | Geography | 2 | 2 | - | - |
| | Mathematics | 4 | - | - | - |
| | Geometry | 2 | - | - | - |
| | Physics | 2 | - | - | - |
| | Chemistry | 2 | - | - | - |
| | Biology | 2 | - | - | - |
| | Health Sciences | 1 | - | - | - |
| | Philosophy | - | - | 2 | - |
| | Foreign Language | 3 | 2 | 2 | - |
| | Physical Education | 2 | 2 | 2 | - |
| | Visual arts/Music | 1 | - | - | - |
| | National Security | - | 1 | - | - |
| Traffic and First Aid | - | - | - | 1 | |
| Common courses in department | Career development | - | 2 | - | - |
| | Accounting 1 | - | 7 | - | - |
| | Usage of keyboard in computer | - | 3 | - | - |
| | Office programs in computer | - | 4 | - | - |
| Courses of branch | Occupational skill training | } | } | 15 | 24 |
| | Accounting 2 | | | | |
| | Computerized accounting | | | | |
| | Entrepreneurism and business management | | | | |
| | Companies accounting | | | | |
| | Cost accounting | | | | |
| | Constructional accounting | | | | |
| | Vocational mathematics | | | | |
| | Financing | | | | |
| | Vocational foreign language | | | | |
| | Foreign trade operations | | | | |
| | Foreign trade regulation | | | | |
| | Foreign trade accounting | | | | |
| | Banking business | | | | |
| | Capital market | | | | |
| Business life | | | | | |

Furthermore, the students are rarely pleased with their department (Demir & Subaşı, 2008; Usul et. al., 2007). According to Usul and his colleagues (2007), students would not continue in accounting departments, if the open admission regulation was abolished. Also, the students consider accountancy as having a broad range of business opportunities, and being a prestigious career (Demir & Subaşı, 2008; Özcan et. al., 2009). Although the students are positive towards accountancy, they are not determined to continue with it. They mainly wish to pass the university entrance exam so they can have education from other departments (Demir & Subaşı, 2008; Özcan et. al., 2009; Usul et. al., 2007). Also, they would continue at a two-year university with an open admission in the same branch if they could not pass the university entrance exam. But the students explained that general courses taught in the department especially mathematics poorly prepare them for the university entrance exam (Demir & Subaşı, 2008; Gençtürk, 2006; Özcan, 2010; Usul et. al., 2007).

The importance of mathematics for accounting and financing department

Changes in the last 50 years have made many important mathematical ideas more relevant in the work and in everyday life. Mathematics is essential for not only major mathematician students but also for liberal arts and vocational high school students. Almost every job requires at least an elementary understanding of mathematics (National Research Council Staff & Mathematical Sciences Educational Board, 1998). Besides, according to Schaaf, (Schaaf, 1937, p.447), mathematics is a unique subject in terms of mode of thought for the followings: “i) the formulation of generalizations, ii) the method of postulational thinking, iii) the ceaseless quest for greater rigor”. Furthermore, the importance of mathematics for vocational high schools students is studied in the department of carpenters and agricultures

(Anderson, 2008; Mohr, 2008). Both results showed that mathematics leads to higher academic achievement and it is an indispensable and integral part of the career life. Additionally, careers of the people in this profession would not live long if they did not have significant mathematical knowledge.

Mathematics is taught as compulsory only in the 9th grade in the department of accounting and financing (see Table 2). Besides, it could be taught as elective courses in the grade 10, 11, and 12. The elective mathematics courses are the same as compulsory mathematics lessons in the grade 10, 11, and 12 in other types of high schools (Talim ve Terbiye Kurulu Başkanlığı, 2010). Therefore, the students in trade vocational high schools are taught the same topics with other high schools. For instance, the students learn complex numbers and matrix which are not directly related to their professional lives in the grade 11 like other students from different types of high schools (Talim ve Terbiye Kurulu Başkanlığı, 2010).

Since the accounting and financing students mainly need the skills of critical thinking, and reasoning, mathematics is also essential for them to satisfy these needs (METARGEM, 2011). Moreover, the curriculum includes a special kind of mathematics lesson that is *vocational mathematics* (see Table 2). The lesson gains knowledge and skills of trading calculations which are fundamental requirements of accounting and financing students. Also, the lesson is based on financial mathematics and business applications so that techniques of easy computing, calculations of percentage, discount, and interest, costs and sales accounts, statistics, and ratio and proportions are taught within the lessons (METARGEM, 2011). Hence, vocational mathematics lessons are one of the clues of significance of mathematics for the students. Likewise, the 9th grade mathematics curriculum is vital for accounting and

financing students if they would like to enter the university (Ölçme, Seçme ve Yerleştirme Merkezi, 2012). Mathematics questions that are asked in the university entrance exam are taught in the 9th grade and the students must have satisfactory mathematics knowledge in order to have a good.

Gap in the literature

In conclusion, mathematics whose aim is to help people understand the world around them, gain critical thinking and problem solving skills, gain a perception of the world in an abstract way, and provide them skills needed in their professional life is an important discipline for all students (Alagic, 2007). As Terrel Bell, the previous US Secretary of Education, emphasized the importance of motivation by stating “There are three things to remember about education. The first is motivation. The second one is motivation. The third one is motivation.” (Covington, 2000, p.171). The mathematics teachers should pay more attention to motivating students so they are more engaged in their lessons since it is a core subject in the high school curriculum. One way of motivating students is connecting them professional life to mathematics. The students should be motivated, if the connections of mathematics with their professional life is presented and mentioned in the lessons (Lee et al., 2010).

The aim of this research is to outline the importance of motivation, giving information about the type of motivations, the goal orientations, and vocational high schools. As it is seen, there are numerous studies on motivation, and the goal orientation among the world. Additionally, great numbers of studies was conducted in vocational high schools to identify students’ profiles, problems, and expectations. Even though, some studies were held to improve vocational education, there is no study on motivation of vocational high school students in Turkey.

CHAPTER 3: METHOD

Introduction

This study used an exploratory mixed method design that is named as instrument development model (QUAN emphasized). Exploratory research design is mainly used when “measures or instruments are not available, the variables are unknown, or there is no guiding framework or theory about the certain topic” (Cresswell & Clark, 2007, p.75).

Research design

Since there is not an existing instrument to elicit students’ motivation in vocational high schools, the instrument development model of exploratory method was used. Exploratory design has two sequential phases that are qualitative and quantitative, and starts with collecting qualitative data to develop the quantitative instrument in order to collect additional data from participants (Cresswell & Clark, 2007).

Therefore, this study was conducted in two phases. As shown in Figure 2, it started with gathering the qualitative data with the help of an interview and continued with developing and implementing a quantitative instrument, which is a survey. Survey questions were based on the qualitative data from the first phase (Cresswell & Clark, 2007, p. 77).

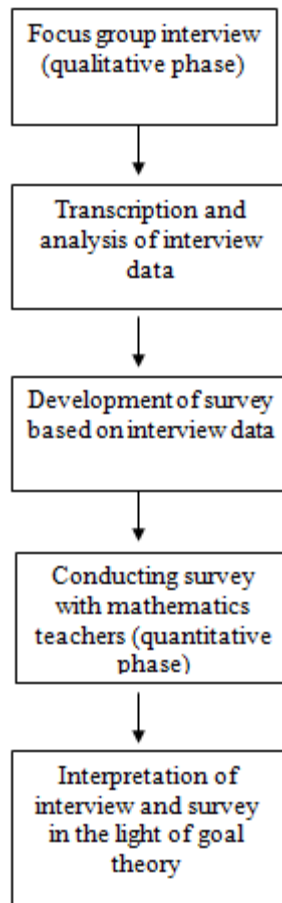


Figure 2. The flow of research design

Context

This study was conducted in Ankara with mathematics teachers in trade vocational high schools with accounting and financing programs. The accounting and financing program was chosen since it requires more than just basic mathematical skills. Since there could be more motivational factors affecting students' motivation in the accounting and financing program, working with mathematics teachers in these schools was appropriate. Phase 1 was conducted with seven mathematics teachers in one school. Thereafter, the survey developed based on the qualitative findings conducted with the mathematics teachers in six schools given in Table 3 in the second phase.

Participants

This study was conducted with mathematics teachers in trade vocational high schools in Ankara, Turkey. The websites of the schools helped in finding the number of mathematics teachers and whether schools had accounting and financing programs. Therefore, trade vocational high schools that have more than five mathematics teachers and include accounting and financing programs were selected purposefully (see Table 3). Phase 1 was applied with seven mathematics teachers in School A. There were one male teacher and six female teachers in the sample for the first phase. Then, 31 mathematics teachers (71% female, 29% male teachers) were sampled for the second phase. All mathematics teachers in School A were participated in the first phase, whereas all mathematics teachers in selected schools could not be reached in the second phase.

Table 3
Numbers of participant teachers in schools

| Schools | Phase 1 | | Phase 2 | | | | |
|-------------------------|---------|---|---------|---|---|---|---|
| | A | A | B | C | D | E | F |
| Numbers of participants | 7 | 5 | 4 | 6 | 3 | 5 | 8 |

Instrumentation

The aim of this study was to find out the factors that motivate trade vocational high schools students' with mathematics lessons. Since there is no previous study on this topic, no instrumentation could be found. Hence, the focus group interview (see Appendix A) was conducted with mathematics teachers in School A. Interview questions were open-ended in order to allow free expression of opinions of teachers and get detailed information about research questions. These nine open-ended questions were posed to mathematics teachers according to the flow of interview and

all answers and discussions were recorded in Turkish. An interview is useful when one wants to learn the story about participants' experiences. Furthermore, focus group design is beneficial for the researcher in terms of exploring ideas and obtaining in-depth information about how people think about an issue.

After collecting opinions from the mathematics teachers through focus group interviews, the discussions and answers of teachers were transcribed and analyzed with coding. Thereafter, a survey with Likert scale items was developed by the researcher based on the analysis of the qualitative phase. The aim of this survey was to see all pieces of the study numerically in the quantitative phase. The survey (see Appendix C or D) included 26 questions; 3 demographic questions, 2 open-ended questions, and 21 survey items using a four points Likert scale (*1: Strongly Disagree, 4: Strongly Agree*). There were three main categories such as extrinsic motivation (7 items), the goal orientation theory (7 items), and intrinsic motivation (7 items) which total of 21 survey items with a four points Likert scale. The aim of this rating scale was to allow participants to “express both the direction and strength of their opinion about a topic”(Garland, 1991, p.1).The participants in trade and vocational high schools were delivered surveys by hand. Afterwards, the survey items were analyzed using descriptive statistics.

Before the survey was given to the participants of the second phase, a pilot study for the survey was conducted with some academicians and trainee mathematics teachers. The opinions of the participants in the pilot study were utilized in order to avoid misunderstandings or ambiguities of survey items. The pilot study also addressed the validity of the survey items. After the pilot study, invalid items were deleted and ambiguities in some survey items were corrected. For reliability, Cronbach α analysis

was calculated using SPSS for each survey item. The Cronbach α examined whether survey items were “internally consistent, stable and homogenous” (Liu & Lin, 2010, p.225). To increase reliability, the unsuitable items would be deleted if needed. The value of the Cronbach α was found as 0.91 that showed the overall reliability of survey items was really high. Therefore, none of the items were deleted.

Method of data collection

Qualitative phase: Data in the first phase was collected with the help of the focus group interview with seven mathematics teachers in School A. The researcher visited school A twice. The first time, mathematics teachers and administrations met to share the aim and significance of the study with the researcher and a contact number of the head of the mathematics department was taken. After arranging a suitable time for all mathematics teachers, the focus group interview was conducted in School A with the second visit. Initially, teachers were informed about the content, significance, and privacy of the study. Afterwards, the open-ended questions were directed to participants according to the flow of the interview and inexplicable questions were paraphrased. Furthermore, all discussions and answers were recorded.

Quantitative phase: Data was collected by the survey that was developed by the researcher based on the first phase of the study. All six trade and vocational high schools in Ankara were visited in five days and four point Likert scale surveys were given by hand to the participants. The participants were informed about the content, privacy, and significance of the study by the researcher. Voluntary participation was essential and all participants were given a code in case of losing the data or mixing up the survey with another one. Survey questions took almost 15 minutes to answer

and participants were not distracted within this time frame. All surveys were kept in the file and answers were saved in an excel file.

Method of data analysis

Qualitative data obtained from Phase 1 was analyzed by content analysis method. After responses to the interview questions were transcribed, answers were categorized and coded. A priori coding was much more suitable and beneficial for this step. The categories were ‘intrinsic motivation’, ‘extrinsic motivation’, ‘the goal orientation theory’, and ‘motivational problems of students’. After analyzing each category, the survey was formed. There were three main categories that are ‘extrinsic motivation’, ‘the goal orientation theory’, and ‘intrinsic motivation’ in the survey. Each category in the survey consisted of seven items. The findings from the category of ‘motivational problems of students’ were entered as open-ended questions in the survey for the teachers.

After administering the survey, the results were analyzed using descriptive statistics and reported using the frequency tables and the percentages. Microsoft Excel and SPSS package 18 were used to calculate frequencies and make the graphs to analyze the data that. The data was entered to Excel and SPSS and the mean of all items was calculated in order to see the item with the highest mean value. Then, a graph of means of the items was formed in Excel. Afterwards, the mean of each category was calculated and the graph was formed to help to understand the relation of the categories. Furthermore, ANOVA was applied to determine whether the relationship between the means of categories was significant or not.

CHAPTER 4: RESULTS

Introduction

This study was conducted using the exploratory mixed-methods design which included two phases. First, the focus group interview was conducted with seven mathematics teachers, when open-ended questions were directed to them one by one. The focus group interview helped to gather teachers' different opinions about the motivation of their students. Data from the interviews was analyzed using content analysis and the survey was developed based on interview findings. Secondly, the Likert-scale teacher survey was carried out with 31 mathematics teachers from the trade vocational high schools in Ankara, Turkey.

Focused group teacher interview

Semi-structured interview questions were prepared with the help of literature and the official websites of the National Ministry of Education. Interviews included questions about motivation, the goal orientation theory, and trade vocational high schools in Turkey (see Appendix A). Focus group interviews were conducted with seven teachers (six female teachers and a male teacher) in School A. The nine open-ended questions were directed to teachers one by one in Turkish. The discussions were recorded using a voice recorder. After transcribing the discussion, it was translated in English (see Appendix B). Responses were categorized and coded to analyze the interview data. Categories were 'extrinsic motivation', 'the goal orientation theory', 'intrinsic motivation', and 'motivational problems of students'.

The summary of analysis from the focus group interviews were given in Table 4 (see Appendix B for the whole interview).

Table 4
Categorization of the interview data

| Category | Opinions of teachers | <i>f</i> |
|--|---|--|
| Intrinsic motivation | Students know that being an accountant needs strong mathematics knowledge | 7 |
| | Beauty of mathematics like art does not attract students | 7 |
| | Learning mathematics is essential since it is a common science | 7 |
| | Using mathematics in everyday life motivates students | 6 |
| | Life is based on mathematics and students know that | 5 |
| | Giving satisfactory answers to the question “where will I use it?” is essential in terms of motivation | 5 |
| | Students do not consider the mathematics curriculum in their schools important for their professional mathematics needs | 3 |
| | Reasoning is important for students’ education which is improved by mathematics | 3 |
| Extrinsic motivation | High school graduation is important even to have a driving license | 7 |
| | University entrance exam makes students study mathematics with greatest interest in grade 12 | 7 |
| | Teachers announce grades of exams in classrooms | 7 |
| | Few students enter the university with open admission | 6 |
| | Praises make students happy | 6 |
| | Students are rewarded after high grades of exams | 4 |
| Aspects of the goal orientation theory | Students rely on teachers and study mathematics in order not to make teacher sorry | 3 |
| | Accounting requires good mathematics knowledge | 7 |
| | Almost every profession needs knowledge of mathematics | 7 |
| | Students do not have future goals | 7 |
| | Showing oneself as clever is important for teenagers | 6 |
| | Internships negatively affected students because of lack of mentoring | 6 |
| | Students are afraid of failure and being disgracing among their peers. | 5 |
| | Competition among students rarely seen | 4 |
| | Few students turn red in the face after failure | 3 |
| | Motivational problems | Although some students are all ears, they could not understand mathematics which destroys their confidence |
| Students do not care about their future or professional lives | | 7 |
| Students have very poor basic mathematics knowledge | | 7 |
| Failure in high school entrance exam makes them start to high school as already being a loser | | 7 |
| Insufficient guiding leads students to vocational high school without regarding their skills or wishes | | 7 |
| Students do not believe that they could achieve mathematics | | 7 |
| Students do not have any idea about vocational high schools and are not ready for it | | 5 |

Note. *f* indicates frequency.

Intrinsic motivation

Studying mathematics for internal results like interests, or curiosities is under the type of intrinsic motivation. Therefore, explanations of teachers that are related to internal reasons were put in the category of intrinsic motivation. Teacher emphasized the importance of mathematics for students. For instance, students internalize that mathematics is highly used in everyday life. Their beliefs are reinforced as much as they encounter examples of real life connection of mathematics. Students' attention with mathematics is keep alive so that they study mathematics because of their own curiosity. Excerpts from interview with teachers about this issue are given below (see Appendix B).

(Teacher C) Life is based on mathematics and students are aware of it.

(Teacher E) As teachers, we connected topics with real life. For instance, first topic is logic and we tell them you would solve all problems in real life by using it. We solve many real life problems by using logic. They become trying to find examples of each topic and understand how valuable mathematics is. So they get motivated.

(Teacher C) For example, I teach functions with using biscuits. I not only teach lesson easier but also connect the lesson with real life.

Aspects of the goal orientation theory in schools

The goal orientation theory is divided into two categories, as mastery goal orientation and performance goal orientation. Students with mastery goal orientation study mathematics because of mastering the task and improving their mathematical skills. Whereas students with performance goal orientation study mathematics in order to show their competence to the others such as teachers and their peers. After the transcription of interview data, the explanations of teachers were put under the goal orientation category without subdivision of mastery and performance goal orientations (see Table 4). For instance, developing skills to be a good accountant could be regarded as an aspect of the goal orientation theory. So, explanations of

teachers about skills of accountant emphasized one of the motives that affect students' learning so that is analyzed under the goal orientation theory (see Appendix B).

Researcher: What do you think about the importance and roles of mathematics in students' professional life? And how much will students be engaged with math's in their professional life?

(Teacher A) Very much. Students who are not good at mathematics could not be successful in accounting. Accounting is impossible without good knowledge of calculation.

(Teacher C) Computerized accounting eases their job. However they still must use their logic as well as mathematical knowledge to use computer properly. Also reasoning is important for their education which improves with mathematics.

Extrinsic motivation

Studying for the sake of external reasons like punishments or rewards could be analyzed under the category of extrinsic motivation. Hence, the explanations and opinions of teachers related external motives are categorized as extrinsic motivation (see Table 4). As an illustration, teachers explained that the most effective external factor that motivates students is university entrance exam to trade vocational high schools. As teachers indicated that below, the university entrance exam highly motivates the students of trade and vocational high schools like other students in regular high schools. In this case, motives are from outside of the students, not because of their own interests or curiosity. Students study mathematics since they believe that solving mathematics questions would help them to enter better university (see Appendix B).

(Teacher A) The lesson that students showed greatest interest in grade 12 was mathematics last year. The reason was just University Entrance Exam. Since they have started going to special places for studying better (called *dershane* in Turkish) in grade 11, they realized the importance of mathematics. They came to classes with high motivations and we solved as much questions as possible. As mathematics

teachers, we continued teaching mathematics in guidance and religious culture and moral knowledge lessons.

(Teacher B) Many students study for the university entrance exam not for their professions. Few students continued with their own department in university. Most of them entered better department that needs more studies. Some of them did not make selection and wait for the next year in order to study more and get better department. They realized the importance of mathematics in last year and studied since they thought math knowledge would be utility in future university entrance exams for them.

Motivational problems of students

Focusing on motivation in the study requires pointing out problems of students as well as identifying factors that affect students learning. For that reason, the teachers emphasized motivational issues and problems of students that they highly encounter with in the classrooms. The motivational problems mentioned during interview are reported in Table 4. As shown in the table, all teachers agreed on the existence of almost all problems among their classrooms. With respect to the teachers, the biggest problem was that the students do not believe in their own potentials. Since students had a big failure in high school entrance exam just before the high school, they see themselves as unsuccessful. Hence, students do not have future goals and are not interested in lessons especially mathematics. For instance, teacher A explained briefly the common problems of students in terms of motivation (see Appendix B).

(Teacher A) Most of our students are pessimistic on their futures. They have no hope about their professional lives so that being successful is almost impossible for them. The profiles of students could be explained as they have lack self-confidence and their parents are not conscious. Students came to vocational schools after the failure in the exam for entering high schools. Their parents send them to these types of schools since they would like their children have a job at least. Therefore, students

of this school are generally without self-confidence and not ready for vocational schools. There is a guidance mistake here. Students who will be accountants must have high reasoning ability, and high commercial acumen. But in reality, they are not.

Likert-scale teacher survey

The three-page survey with 26 questions was constituted based on themes from the focused group interview. The survey was conducted with 31 mathematics teachers who were working in six different trade vocational high schools. The first page included five questions. Three of them aimed to gather demographic information, whereas other two questions were open-ended. The next 21 questions are in second and third pages. These questions were statements with four points interval Likert scale. Participants indicated 1 for strongly disagree and 4 for strongly agree; 2 and 3 were not labeled.

Demographic information

Participants were asked to answer the first three questions whose aims were to gather demographic information about the participants. The questions were about gender, the year of being teacher, and the year of teaching in their current schools. There were 22 female teachers (71%) and 9 male teachers (29%). Besides, Table 5 shows the percentages of participant in each trade vocational high schools'. The teachers from school F (26%) consisted the largest amount of the sample, whereas those from school D (10%) included the smallest group in the sample.

Table 5
Distribution of participant schools in Phase 2

| Schools | A | B | C | D | E | F |
|---------------------------------------|----------|----------|----------|----------|----------|----------|
| Numbers of participants (percentages) | 5(16%) | 4(13%) | 6(19%) | 3(10%) | 5(16%) | 8(26%) |

When the year of teaching is taken into account, it could be seen that mathematics teachers in the sample were experienced ($M: 14.1, SD: 5.5$). Also, as Table 6 shows that the largest amount of teachers (29.0%) had been teaching for 11 years. Being a teacher for 12 years (16.1%) was the second largest group in the sample. The smallest amounts of the participants had been teaching for 30 years (3.2%), 29 years (3.2%), 18 years (3.2%), 15 years (3.2%), 14 years (3.2%), 10 years (3.2%), 8 years (3.2%), and 3 years (3.2%).

On average, the mean of teaching in current schools is 5.5 ($SD: 5.9$). As seen in Table 6, being a teacher in current school for two years (29, 0%) was the most frequent answer followed by being teacher in current school for one year (19, 4%).

Table 6
Years of being teacher and years of teaching in the current school

| Years of being teacher | | | Years of teaching in current school | | |
|------------------------|-----------|---------|-------------------------------------|-----------|---------|
| Years | Frequency | Percent | Years | Frequency | Percent |
| 3 | 1 | 3.2 | 1 | 6 | 19.4 |
| 8 | 1 | 3.2 | 2 | 9 | 29.0 |
| 10 | 1 | 3.2 | 3 | 4 | 12.9 |
| 11 | 9 | 29.0 | 5 | 2 | 6.5 |
| 12 | 5 | 16.1 | 6 | 1 | 3.2 |
| 13 | 2 | 6.5 | 8 | 2 | 6.5 |
| 14 | 1 | 3.2 | 9 | 1 | 3.2 |
| 15 | 1 | 3.2 | 10 | 2 | 6.5 |
| 16 | 2 | 6.5 | 15 | 1 | 3.2 |
| 17 | 2 | 6.5 | 16 | 1 | 3.2 |
| 18 | 1 | 3.2 | 20 | 1 | 3.2 |
| 20 | 3 | 9.7 | 24 | 1 | 3.2 |
| 29 | 1 | 3.2 | | | |
| 30 | 1 | 3.2 | | | |

Likert-scale items: Teachers' view on factors motivating student mathematics learning

Participants answered 21 survey items to identify the factors that affected students' motivation towards mathematics. Figure 3 shows the mean of each item in descending order. The most common factor that affected the motivation of trade vocational high school students towards mathematics was A07 ($M=2.7$) that is graduation from a high school. High school graduation was followed by getting rewards ($M= 2.6$). Moreover, the least common factor that affected students motivation towards mathematics was C03 that is beauty of mathematics ($M=1.1$). Student beliefs in curriculum (see Appendix C or D) was the second least factor ($M= 1.4$). The rest of items are placed between these items.

As it is seen in Figure 3, each survey item was categorized as extrinsic motivation, the goal orientation theory, or intrinsic motivation. The mean of each category was also calculated as shown in Figure 4. The mean of extrinsic motivation ($M=2.4$) was higher than the mean of the goal orientation theory ($M=1.9$) and the mean of intrinsic

motivation ($M=1.5$). According to Figure 4, the goal orientation theory was placed between extrinsic motivation and intrinsic motivation. In order to look at whether the differences in three categories were significant or not, one-way ANOVA was used. According to the analysis, $F(2, 90) = 17.8, p < .01$, there was a significant difference between the three means. A post-hoc test (Bonferroni) also revealed that there was significant difference between every combination of the two categories.

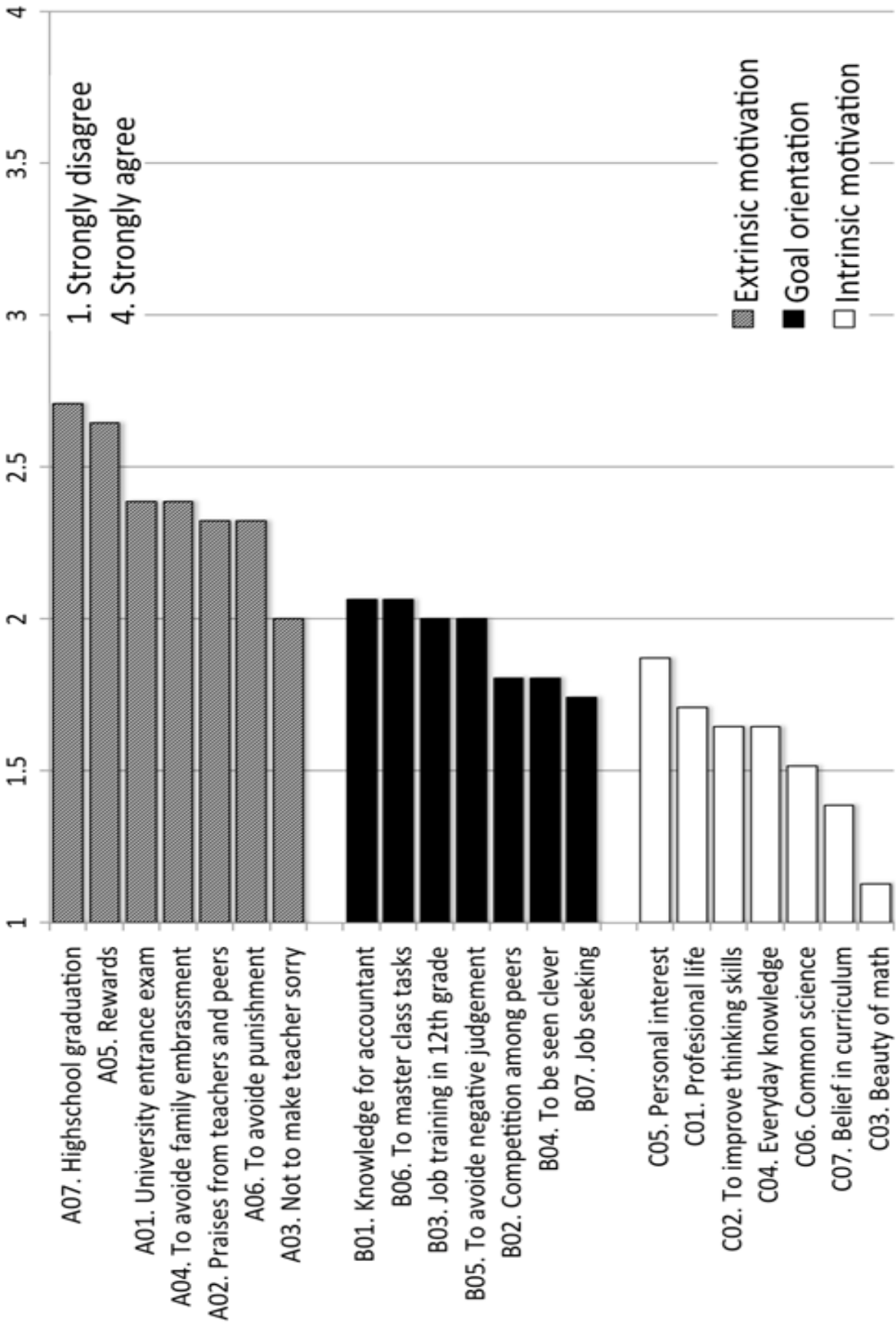


Figure 3. Teachers' opinions on the Likert-scale survey

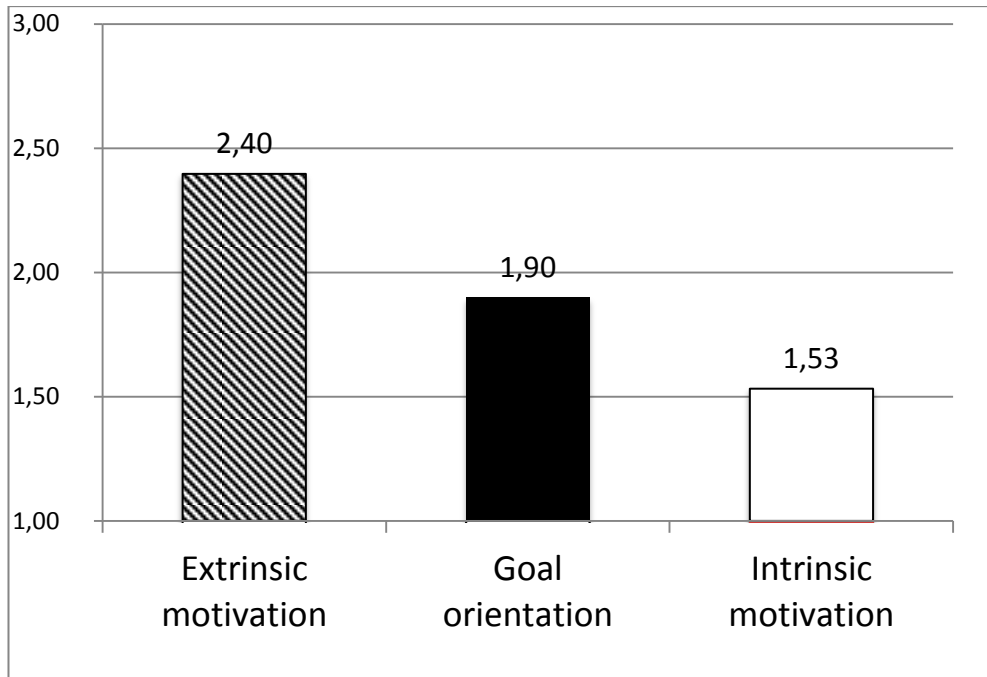


Figure 4. The place of the goal orientation theory ($F(2, 90) = 17.8; p < .01$)

Open-ended items: Reasons of students' low motivation in vocational schools

The survey included two open-ended questions that are 'Could you please explain briefly the profiles of accounting and financing students?' and 'What do you think about the connection between trade vocational high school curriculum and professional needs of students in future?' Thirty one teachers from various schools answered these questions. Answers from these questions are given in Table 7 with the frequencies.

Table 7

Analysis of open-ended questions

| Questions | Opinions of teachers | <i>f</i> |
|--|---|---|
| Profile of students | Students have lack of basic mathematics skills like basic operations | 26 |
| | Students do not believe themselves in achieving mathematics | 12 |
| | Students do not feel confident in terms of having a good profession | 10 |
| | Students are not interested with mathematics lessons | 9 |
| | Students were misguided after primary schools | 8 |
| | Students are afraid of mathematics | 6 |
| | Students are not aware of the importance of mathematics | 5 |
| | Students strive to understand mathematics but they have great difficulty (some of them) | 3 |
| | Students do not have future goals | 3 |
| | Students mostly have problematic families (children of divorce, financial problems) | 2 |
| | Students have good basic mathematics knowledge | 1 |
| | Students concern the ever-changing university entrance exam | 1 |
| | Curriculum | Curriculum as a whole (especially topics logarithm and integral) do not satisfy students professional needs |
| Curriculum should be much more easier | | 11 |
| Mathematics hours should be increased | | 6 |
| Curriculum of 9 th grade is beneficial for university entrance exam | | 5 |
| Curriculum should differ from other high schools | | 4 |
| | Curriculum is appropriate for students | 1 |

Note. *f* indicates each frequency.

Student profiles in accounting and financing programs

The analysis of first open-ended questions in Figure 3 and Figure 4 presents the views of the teachers on the profiles of accounting and financing students with frequencies. 26 out of 31 teachers claimed that the students had poor basic mathematical knowledge skills even they could not divide 8 by 4 without the use of a calculator. Furthermore, the teachers (38.7%) expressed that the students had severe self-esteem problems. According to the teachers, the students did not believe in themselves in terms of achieving mathematics. Since the students were already unsuccessful in mathematics in primary schools, they strongly believed that they could not understand mathematics although they would really try hard. Teachers

emphasized that (32.3%) the students also do not feel themselves confident in terms of having good professions in future.

Mathematics curriculum and students' professional needs

The analysis of second open-ended questions indicated the teachers' opinions on the connection between mathematics curriculum and students' professional needs in the future (see Table 7). Seventy one percent of the teachers claimed that the curriculum was not appropriate for the students. According to the teachers, the mathematics curriculum did not satisfy the needs of students. Accounting and financing program requires strong knowledge of carrying on percentages, statement of loss and gains as well as having strong reasoning skills. However, many topics like integral, logarithms, and complex numbers were irrelevant to the students' real needs (see Table 2). Besides, the teachers insisted that the curriculum was so hard for students who even could not do basic operations.

CHAPTER 5. DISCUSSION

Introduction

This study primarily investigated the factors that affected student mathematics learning in trade vocational high schools as perceived by the mathematics teachers. Therefore, 31 mathematics teachers from various trade vocational high schools were asked to answer questions not only in the qualitative phase but also in the quantitative phase.

Discussion of the findings

Students are mostly affected from external incentives

It was found that extrinsic reasons like university entrance exam, high school graduation, and rewards were significantly effective for students' motivation towards mathematics. In other words, external incentives were more efficient than internal incentives like curiosity or interest in trade vocational high students. The statements about the goal orientation theory are also less effective than the statements of extrinsic motivation according to the teachers' views (see Figure 4 and Figure 3). Trade vocational high school students were unsatisfactorily impressed by the desire of having skills for a successful professional life. This is consistent with previous finding which claimed that the effects of internal incentives such as curiosity and desire of exploring are decreasing gradually, as students' progress through schools (Goh, 1998). Since students of trade vocational high schools are between 14 and 23 years, students become slightly impressed by intrinsic motivation. Also, higher extrinsic motivation is consistent with finding of Nicholls (as cited in Wentzel &

Wigfield, 2009). Nicholls emphasized that exam-based educational systems lead to high extrinsic motivations among students, since the motive does not come inside (as cited in Wentzel & Wigfield, 2009). Since our education system includes too many exams like university entrance exam and high school entrance exam, students must compete with other students in Turkey which increase their extrinsic motivation.

Teacher emphasized that having a high school degree highly motivated students among other possible 20 factors. Students could benefit from high school graduation in three ways. One of them is starting a business as an accountant upon completion of high school that is related with previous research (METARGEM, 1996; Özcan, 2010). The second one is entering the university with the open admission. Students who graduated from vocational high schools can enter the related department of a 2-year university within their graduated department. For instance, students in accounting and financing departments could enter their related department in a 2-year university without taking an exam after graduation from trade vocational high schools. It is consistent with findings of Çetinkaya (2010) presented that most students receive education in trade vocational high schools in order to continue university in their own department without examination (Çetinkaya, 2010). The last one is some regulations of country like qualifying for a driving license. One of the teachers explained that some students study mathematics to be able to enter the qualifying examinations required for reaping a driving license. Licensing people who do not have high school degree is being discussed recently and students are aware of it.

According to the teachers, students are slightly affected by internal reasons and the goal orientation theory in trade vocational high schools. Internal reasons as curiosity

about mathematics, beauty and importance of mathematics are the less effective factors for students' motivation, whereas external factors are the most efficient factors. The previous studies explained the situation as undermining of intrinsic motivation by extrinsic incentives (Ames, 1992; Deci et al., 2001; Maehr & Midgley, 1991; Wentzel & Wigfield, 2009). Motivating students intrinsically has been a great difficulty for teachers. Therefore, teachers mostly use external incentives like rewards and punishments to motivate students towards their courses (Çakmak & Ercan, 2003; Jacobs & Newstead, 2000; Slavin, 2006; D. Stipek, 1998). The second most effective reason which is rewards is consistent with the findings in literature.

Reasons of students' low motivation

As it is shown in Figure 3 and 4, students in trade vocational high schools have a lack of motivation towards mathematics. Although extrinsic motivation has the maximum mean among all three categories, its mean is still lower than the middle, which is 2.4 out of 4. Both survey and interview data represented the situation of students as perceived by teachers in trade vocational high schools clearly. The students in trade vocational high schools have self-esteem problems in terms of achieving mathematics and having successful professional lives. Furthermore, they do not have basic mathematics knowledge enough to understand further topics, which discourages their confidence and beliefs in achieving mathematics.

Insufficient guiding leads to being unconscious about the trade vocational high schools. These findings imply that many students are not interested in mathematics.

Since the students start trade vocational high schools because they mostly do not have other choices, many students are unconscious about trade vocational high schools as well as not having future goals (Demir & Subaşı, 2008). Failure in a high

school examination or not being able to enter regular high schools because of unsatisfactory diploma grades compelled students to attend trade vocational high schools (Çetinkaya, 2010; Demir&Subaşı, 2008; Özcan, 2010). More than half of the students advanced to trade vocational high schools without their desires. For these reasons, students did not receive vocational guidance adequately which could help them to find the most appropriate job according to their skills and ability. Hence, students do not understand why they are studying in trade vocational high schools and do not pay adequate attention towards their departments and lessons. All of these are consistent with explanation of the low motivation which says unmotivated individuals do not have specific goals and specific way to achieve the end of the goals (Barkaukis et al., 2008).

One of the most consistent explanations of teachers in both phases of data collection is the lack of confidence of the students. Many teachers stressed that students do not have self-esteem in terms of not only having successful professional lives but also achieving mathematics lessons. Having many failures before high schools such as high school examinations and graduating hardly from high schools affect them negatively with regards to self-confidence. Therefore, students ignore their skills and abilities so that lack of self-confidence becomes part of their personality. The situation is related to Maslow's *Hierarchy of Needs Theory*. As Maslow explained self-esteem needs are in the fourth step in the hierarchy of needs pyramid. Students need to believe in their own strengths and abilities so as to be successful in any activity or lessons (Best et al., 2008; Maslow, 1970). Therefore, having lack of self-confidence is one of the obstacles of students' motivation.

Likewise, being unsuccessful in mathematics lessons leads to the self-esteem problems among students. Research shows that majority of students wants to take university entrance exam (LYS and YGS in Turkey) to advance to a higher rank department in university (Çetinkaya, 2010; Demir&Subaşı, 2008; Özcan, 2010). Since mathematics is important to be successful in the university entrance exam, students must study hard mathematics in order to achieve their goals. According to sampled teachers' opinions, although students overexert to understand mathematics, students could not understand the mathematics because of having poor basic mathematical knowledge. Hence, students' self-confidence is destroyed. The attribution theory explains it as being unsuccessful in certain course consecutively decreases one's self-esteem. That is, students tend to state a reason of one or two failures as bad luck. When their failure continues, they start looking for internal reasons as lack of their abilities and losing their self-confidence (Slavin, 2006; Weiner, 1990; Wentzel & Wigfield, 2009).

Moreover, not understanding the importance of mathematics is also a reason for the lack of motivation of students in trade vocational high schools. Research on vocational high schools presented that a considerable amount of students hoped to continue their education in the university with the open admission that allows two-year universities without any examination (METARGEM, 1996; Özcan, 2010). The importance of mathematics for students who would continue accounting and financing department in university is declared (Kenar, 2010; METARGEM, 2011; Ölçme, Seçme ve Yerleştirme Merkezi, 2012). However, students are not aware of the importance of mathematics in real and their professional lives that is the cause of lack of motivation (Hyslop, 2008; Mohr, 2008; Scarpello, 2009).

Mathematics curriculum is not appropriate for students

Both of the interview and survey data showed that many topics of mathematics in trade vocational high schools are not appropriate for the students. It is coherent with the previous research claiming mathematics is insufficient to prepare students' professional lives (METARGEM, 1996). Only in the 9th grade (METARGEM, 2011), mathematics lessons are compulsory for trade vocational high schools. In the 10th, 11th and 12th grades, mathematics is taught as an elective course in the participant schools. The curriculum of mathematics lessons is the same for all types of high schools (Ticaret ve Turizm Öğretimi Genel Müdürlüğü, 2010). Therefore, students in trade vocational high schools are taught the same topics as students in other types of schools. Thus, the curriculum is not specialized for trade vocational high schools students. Furthermore, the curriculum as a whole does not satisfy students' professional needs as well as is not suitable for students' mathematics knowledge level. For example, the topics taught in normal high schools, such as integral, complex numbers, and derivative, are also taught in vocational high schools without considering different student levels or students' special career choices.

Likewise, the teachers stressed that only the 9th grade curriculum is beneficial for trade vocational high schools because of the university entrance exam. The previous research showed that majority of students aimed to take university entrance exam in the 12th grade in trade vocational high schools. Furthermore, students are responsible for all 9th grade mathematics topics in university entrance exam (Ölçme, Seçme ve Yerleştirme Merkezi, 2012). Thus, although most topics are not beneficial for students' professional lives, students in trade vocational high schools get benefit from 9th grade curriculum with regards to university entrance exam. On the other hand, for considerable amount of students who would not take the university

entrance exam, the mathematics curriculum even the 9th grade topics are might not be relevant. Thus it is one of the reasons of the lack of motivation of students.

Implications for practice

This study showed that the students in trade vocational high schools were motivated extrinsically as perceived by the mathematics teachers. According to the mathematics teachers, the students are not motivated sufficiently to engage in mathematics lessons. The most effective incentive that motives students to study mathematics was found to be able to graduate from high school. The second most efficient incentive was rewards. Therefore, mathematics itself is not a strong motive that makes students study in trade vocational high schools. Teachers' opinions about reasons of the situation were explained in terms of curriculum and readiness of students to learn mathematics. In the light of the findings, suggestions to improve the situation were written.

This present study showed that students in trade vocational high schools are not aware of why they have advanced to the trade vocational high school. Many students start trade vocational high schools compulsorily. Besides, becoming a student of it is the decision of students' parents generally. Thus, students do not have a chance to choose the school that they would attend according to their skills and interests. It is suggested that each student should be analyzed deeply so as to figure out his or her own strengths, abilities and interests. Then student should be guided to high school which suits well with personality, abilities and interests of each child. Additionally, students should internalize what trade vocational high school is and set up future goals for their professional lives.

Another issue that should be deal with immediately is boosting students' self-esteem. One of the main reasons of low motivation is lack of self-confidence. Since students with low self-confidence do not believe in achieving mathematics, they consider studying mathematics does not provide much relevant knowledge. Mathematics teachers should be more patient in developing students' self-esteem. Initially, classroom climate should be peaceful and psychologically safe so that students could express themselves and encourage risk taking. Furthermore, teachers should start with easy problems that the students will succeed in solving. Teachers should also value students' efforts even if they could not accomplish task. Together with easy problems, teachers should set realistic goals that are appropriate for the students and should give positive feedbacks as well as praises to them after each little success. Feeling oneself important is also essential to increase self-confidence. Teachers should care for each student and make them feel important. Also, teachers should find something unique about each student and mention it in classrooms frequently that make students feel better about them.

Moreover, the mathematics teachers with whom the interview was conducted (School A) mentioned that they tried to increase students self-confidence. In School A, alumni who had successful in their profession or business were invited to make a speech at the beginning of each semester. The alumni told about their business lives to new students and new students could ask questions to former students if they want. The aim was representing former students as good examples who already graduated from the same school. Showing good examples make students think as they could be successful too which boost their self-confidence.

The mathematics curriculum is another issue in trade vocational high school. The present study presented them mathematics curriculum in trade vocational high school is not appropriate for students in terms of professional needs and level of difficulty. The mathematics curriculum should be revised according to students' needs. Topics should be special to trade vocational high schools and respond to students professional needs. Since most students do not have strong mathematics knowledge, topics should not be difficult to understand and apply in real life. Additionally, teachers emphasized that teaching hours of mathematics are as half as the other high schools which is not enough for trade vocational high students. Increasing teaching hours is recommended.

As Figure 3 and Figure 4 are taken into consideration, the goal orientation theory is seen as being placed between intrinsic motivation and extrinsic motivation. As it is pointed out in Figure 3 and Figure 4, the level of intrinsic motivation was perceived as low among trade vocational high school students. That is, the students mainly do not study mathematics in trade vocational high schools for the sake of learning it. Therefore, the knowledge is not long-lasting and valuable for them. Hence, the goal orientation theory could be used as a bridge to increase students' intrinsic motivation. Teacher should focus on informing students to master the skills or obtain knowledge that could be beneficial in students' career lives. Concrete examples about the use of mathematics in professional life should be solved in classrooms and students should be well informed that mastering mathematics is one of the key skills of accountant. Additionally, internship is essential for students to obtain the skills that accountant need. Hence, internship could be considered important and especially administration should try hard to increase the quality of internships.

Besides, classroom climate and teachers' efforts are important to increase students' motivation intrinsically. Students should be encouraged to set future goals to achieve in their career lives. By this way, students realize where they are as students and have aims to reach by studying. Teachers should provide many tasks or activities addressed same objectives and give students chance to select their own task or activity to complete. It would help student to own the task which motivate them. In addition, students should be given chance to reflect their own learning. Teachers should direct questions to students to find their own mistakes and comment about their own strengths. Thereby, students internalize the tasks and not only realize their mistakes but also figure out their strengths. Additionally, teachers should avoid using norm-referenced criteria to assess students. Norm-referenced criterion causes students to compete with others instead of develop their own skills. Moreover, fast learners should be encouraged to challenging activities so that they desire to develop their skills further which would increase their intrinsic motivation.

Implications for research

This study represented factors that affect students' mathematics learning in trade vocational high schools from the points of views of the mathematics teachers. The most efficient factor is high school graduation and the second effective motive is rewards. On the other hand, the beauty of mathematics is the least efficient motive that makes students study mathematics. Besides, belief in curriculum is the second least incentive. All these factors were based on mathematics teachers' opinions. Future research could focus on opinions of students in trade vocation high schools. Trade vocational high school students could be participants of further studies. Besides, future studies could be conducted in regular high schools to figure out whether factors are the same or not. Also, it could be conducted in future studies

whether there is difference between the motivations of male and female students or not.

Additionally, this present study pointed out problems of mathematics curriculum in trade vocational high school from teachers' points of views. It is found that mathematics curriculum is not appropriate for students in terms of knowledge level and professional needs. Thus, studying on curriculum is recommended to further studies. Strengths and weakness of mathematics curriculum should be analyzed in detail. Various opinions of mathematics teachers, administrations and curriculum designers should be represented in order to revise mathematics curriculum in the best way.

Limitations

In Turkey, there are four types of vocational high schools: vocational and technical high schools for boys, vocational and technical high schools for girls, and trade and tourism vocational high schools. The focus of the study was on trade vocational high schools which include accounting and financing, retail and marketing, office management and secretaryship, information technologies, electric-electronic technologies and transportation programs. The participants were from the accounting and financing department. Therefore, the findings should not be generalized to the other departments or to the other types of vocational high schools.

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APPENDICES

APPENDIX A: Semi-structured interview questions

1. Could you please give information about the curriculum of mathematics that you teach in the department of Accounting and Financing?
 - 1.1. In which grade and how many hours do you teach mathematics?
 - 1.1.1. What do you think as a possible the reason(s) of this kind of curriculum?
 - 1.2. Does curriculum include any special mathematics lessons like *vocational mathematics*?
 - 1.2.1. If yes, could you explain the content and the importance of lesson for students?
2. What do you think about the importance and roles of mathematics in students' professional life?
3. Is there any connection between the mathematical needs of students in their professional life and the mathematics curriculum? If yes, please explain
4. If mathematics is important in students' professional life, are students aware of it?
 - 4.1. If no, what could be done to change the situation?
 - 4.2. If yes, how can the importance of mathematics help in order to motivate students towards mathematics?

5. Could you please explain the regulation of the internship that is followed in Accounting and Financing department?
 - 5.1. In which grade(s) do students internship?
 - 5.2. How long does the internship take?
 - 5.3. Is there any change in the motivation of students towards mathematics after the internship?
 - 5.3.1. If yes, in what ways does it change?
6. What do you think about the roles of rewards and punishments during the lessons?
 - 6.1. Do you use any of them in lessons?
 - 6.2. If yes, could you please explain the effects of them to motivate students?
7. How do you announce the scores of exams to students?
8. What do you think why students study mathematics?
9. What do you think what the sources of motivation of students towards mathematics are?
 - 9.1. University entrance exam?
 - 9.2. Having high grades?
 - 9.3. Possible applications of mathematics in professional life?
 - 9.4. High regards from teachers, parents and friends?
 - 9.5. Competitions among students?
 - 9.6. Beauty of mathematics

APPENDIX B: Transcription of interview

1. Could you please give information about the curriculum of mathematics that you teach in the department of Accounting and Financing?

(Teacher A) Curriculum is the same for all 9th grades. Students choose a branch in 10th grades. If students enter regular high school, they would not have compulsory mathematics lesson any more. If students enter to Anatolian high school, they would have 2 hours mathematics in 10th grade and 2 hours geometry in 11th grade. Also both of them have 2 hours elective mathematics in 12th grade. In this lesson, we prepare students for university. Until the first part of university entrance exam, topics of the first one that are in the syllabus of 9th grade are taught. After first exam, we blend topics of other grades and teach them till the second part of exam.

1.2. Does curriculum include any special mathematics lessons like *vocational mathematics*?

(Teacher A) Yes, there is a vocational mathematics lesson in curriculum but, it is taught by department of accounting teachers.

What is taught?

(Teacher A) Topics about trade like percentages, interest are taught. Also name of it has changed as *trade mathematics*.

1.1.1 What do you think as a possible the reason(s) of this kind of curriculum?

(Teacher A) Reason is completely university entrance exam. Mathematics is taught compulsory just in 9th grades. We decided to suggest to school administration putting extra mathematics lessons in curriculum in order to increase the success level of our students in university entrance exam. And school administration does their bests for our students. On the contrary, it will be a big problem next years since MEB has decreased the number of elective courses.

2&4 Paraphrasing of the question “What do you think about the importance and roles of mathematics in students’ professional life?” as How much will students be engaged with math’s in their professional life? And “if mathematics is important in students’ professional life, are students aware of it?” both questions would be answered here.

(Teacher A) Very much. Students who are not good at mathematics could not be successful in accounting. Accounting is impossible without good knowledge of calculation.

(Teacher C) computerized accounting ease their job. However they still must use their logic as well as mathematical knowledge to use computer properly. Also reasoning is important for their education which improves with mathematics.

(Teacher E) Not giving enough importance on curriculum does not bother students. Since they are insensible on their future and their basic mathematics knowledge is very bad even they could not make basic operations, mathematics becomes extremely hard for them. So, insufficiency of mathematics in curriculum does not bother the students.

4.1. You said that students are not aware of the importance of mathematics and they are insensible of their future so what could be done to change the situation?

(Teacher A) Most of our students are pessimistic on their futures. They have no hope about their professional lives so that being successful is almost impossible for them. Therefore, we invite our previous students who graduated from this school and have successful business life now to our school. We arranged seminars and conferences during years especially at the beginning of semester. As teachers, we represent them as good examples to say that they are also graduated from this school. Students

become excited and begin thinking in positive way. Showing good examples make them think as they could be successful too. We try to get them motivated in this way. Then they become excited and believe in themselves. The profiles of students could be explained as they have lack self-confidence and their parents are not conscious. Students came to vocational schools after the failure in the exam for entering high schools. Their parents send them to these types of schools since they would like their children have a job at least. Therefore, students of this school are generally without self-confidence and not ready for vocational schools. There is a guidance mistake here. Students who will be accountants must have high reasoning ability, and high commercial acumen. But in reality, they are not.

(Teacher E) students were selected by exams before they come to this school previous years which was well. But at present, teacher and families decide to send the child to vocational high school without regarding the student's own interest and capacity. Most of them do not have enough knowledge in Turkish and mathematics that's why students who graduated from here are now well qualified and could not work anywhere satisfactorily. Students should enter high schools according to their interest and capabilities like exams in abroad.

(Male teacher) Students must be ready for occupation in terms of psychology, skills and knowledge where they come to the school in order to be good accountants.

1.1.After attempts for motivate them, are there any difference on their motivation?

(Teacher A) The lesson that students showed greatest interest in grade 12 was mathematics last year. The reason was just University Entrance Exam not seminars or conferences. Since they have started going to *dersane* in grade 11, they realized

the importance of mathematics. They came to classes with high motivations and we solved as much questions as possible. As mathematics teachers, we continued teaching mathematics in guidance and religion and ethics lessons. On the other hand, students in grade 9 do not pay attention on mathematics, since they have just overcome an importance exam that is for entering high schools (SBS). They know the importance of mathematics but they do not pay attention because of the relaxing after SBS. Generally, students are all ears, but they could not understand which makes them lack of self-confidence. As teachers, we try to overcome the problem with dealing with students one by one. As teachers, we try to impress them in positive ways, understand their problems from their eyes. Afterwards, students rely on teacher and study mathematics in order not to be ashamed to the teacher. Teachers should increase students' motivation with the help of easy questions instead of yelling to them. By asking an easy question, students could realize that they could do mathematics and they begin participating with lesson more. Increasing their motivation in these ways is written in our department reports.

(Teacher F: male teacher) One size does not fit all.

(Teacher A) If students felt that you are interested with them, they study and would come for thank to you after he or she had a good job.

(Teacher C) Students do not have goals.

(Teacher A) I feel depressed when I have a lesson to grade 9. Because students do not know why they are here now.

(Teacher F) Learning mathematics is really essential and cannot be undervalued.

(Teacher B) Many students study for the university entrance exam not for their professions. Few students continued with their own department in university. Most of them entered better department that needs more studies. Some of them did not make selection and wait for the next year in order to study more and get better department. They realized the importance of mathematics in last year and studied since they thought math knowledge would be utility in future university entrance exams for them.

5. Could you please explain the regulation of the internship that is followed in Accounting and Financing department?

(Teacher A) Students start to internship in last year. They go to the place for internship two days in a week and come to school three days in a week. And the effect of internship is negative in terms of mathematics.

(Teacher C) Students disheartened from the school since business life attracts them.

(Teacher F) Internship is independent from school. It is related with the place that they work and the internship teacher. Some internship teachers pay great attention to students in order to teach them something, whereas some of them do not care on students and students learn nothing in internship.

Are there any examples who realize mathematics is really useful in the profession and start studying mathematics after the internship?

(Teacher F) Unfortunately, there is not any student even one example for this type of student. Because mentors of students in internships do not force them to learn something. So, students do not learn.

(Teacher C) Also people could not trust to students. That's why internship teachers do not give responsibility of accounting to students.

6. How much do you use rewards and punishments in lessons?

(Teacher C and E) We reward them when they have a high grade from an exam. It works if students are hardworking and it is meaningless for others. However, it does not create a competition among students.

(Teacher C) Respect was the most important thing before. But students imitate students in abroad and they are not respectful nowadays. Their faces do not go red after failure whereas a failure was the biggest shame before.

7. How do you announce the scores of exams to students?

(All teachers) We announced the grades in classroom and distribute the papers to them so that they could realize their mistakes. Students who get high marks are glad whereas there is no reaction with students who get low marks.

8. What do you think why students study mathematics?

(Teacher C) Life is based on mathematics and students are aware of it.

(Teacher E) As teachers, we connected topics with real lives. For instance, first topic is logic and we tell them you would solve all problems in real life by using it. We solve many real life problems by using logic. They become trying to find examples of each topic and understand how valuable mathematics is. So they get motivated.

(Teacher C) For example, I teach functions with using biscuits. I not only teach lesson easier but also connect the lesson with real life.

(Teacher E) Students ask “where would I use it?” in every topic and are happy if they receive satisfactory answer. They generally remember the examples that are the connection of each topic with real life.

9. What do you think what the sources of motivation of students towards mathematics are?

9.1. University entrance exam?

9.2. Having high grades?

9.3. Possible applications of mathematics in professional life?

9.4. High regards from teachers, parents and friends?

9.5. Competitions among students?

9.6. Beauty of mathematics?

(Teacher C) None of them

(Teacher F) These are all important and effect students if students really want to learn mathematics. Their importance change from year to year. For instance, university entrance exam is the most important one for grade 12.

(Teacher E)Teacher could motivate students as solving 5mathematics problem is beneficial rather than solving 3mathematics problem in grade 12. But it is meaningless in grade 9.

(Teacher F) Showing oneself as clever is important in grade 9

(Teacher C) Our students are not mature enough to study mathematics for future. And beauty of mathematics is the least important one for them, if we rank the reasons.

(Teacher A) One of the biggest reasons for failure is not be able to do basic operations so that they become afraid for solving problem on the board.

(Teacher A) Students in regular part of high school are afraid of failure. When they pass grade 12, they are affected from university entrance exam and become interested in lesson for solving at least one problem in exam. Students in Anatolian part generally think about their future and applications of mathematics in future. So 9.1, 9.2 and 9.3 are the sources of motivation for them. If students are believed themselves as they could learn mathematics, they actually learn it.

(Teacher E) Students are much more interested in university. Lots of new departments are opened, number of students who could start to departments is

increasing and the sufficient grades for departments are decreasing. These are good news for students and they start to believe themselves more and study better.

(All teachers) Competition does not occur in classes much. However, if teacher stimulates them positively like saying “I know you could achieve mathematics” or “I am pleased that you start studying mathematics”, students get motivated highly and start studying.

(All teachers) Beauty of mathematics does not attract them since they could not be represented them sufficiently. If we have more time and more classrooms, we could prepare some mathematics classrooms that show them beauty of mathematics with paintings or posters. Afterwards, we could see whether mathematics classroom increase their motivation or not.

APPENDIX C: Survey of factors that affect students mathematics learning

(translated from Appendix D)

What is your gender?

How long have you been teaching?

How long have you been teaching in this school?

Part A. Please answer these questions according to your own view

1. Could you please explain briefly the profiles of accounting and financing students?

2. What do you think about the connection between trade vocational high school curriculum and professional needs of students in future?

Part B. Please answer following items according to your observations and opinions about your own students. In other words, indicate what your students think rather than what you think about them

| | | Strongly Disagree | | | Strongly Agree |
|-----|---|-------------------|-----|-----|----------------|
| | | (1) | (2) | (3) | (4) |
| A01 | My students study math, because they want to be successful in university entrance exam | | | | |
| A02 | My students study math, because they want to be appreciated from their teachers or from their peers after high scores | | | | |
| A03 | My students study math, because they avoid to make me sorry because of their possible low grades. | | | | |
| A04 | My students study math, because they do not want to be ashamed of their parents because of low grades. | | | | |

| | | | | | |
|-----|--|--|--|--|--|
| A05 | My students study math, because of the rewards like extra grades or praises that are given after their success. | | | | |
| A06 | My students study math, because of the possible bad outcomes of failure. | | | | |
| A07 | My students study math, because they want to graduate from high school. | | | | |
| B01 | My students study math, because they want to have a required mathematical knowledge to be a good accountant. | | | | |
| B02 | My students study math, because they have a competition among them. | | | | |
| B03 | My students study math, because they realize its importance during their job training in 12th grade. | | | | |
| B04 | My students study math, because they want be clever to their peers, teachers, and parents. | | | | |
| B05 | My students study math because they don't want to be regarded unsuccessful by their peers in mathematics lessons. | | | | |
| B06 | My students study math, because their goal is to fully understand or master the tasks that I give them in the classes. | | | | |
| B07 | My students study math, because mathematics will be helpful for seeking their job. | | | | |
| C01 | My students study math believe they internalized the importance of math in their professional life. | | | | |
| C02 | My students study math, because they want to improve their thinking and reasoning skills with the help of mathematics | | | | |
| C03 | My students study math, because of the beauty of the math. | | | | |
| C04 | My students study math, because they are impressed highly use of it in everyday life. | | | | |
| C05 | My students study math, because they are personally interested in it and want to learn it deeply. | | | | |
| C06 | My students study math, because they internalize math is a basic science for all people. | | | | |
| C07 | My students study math, because they strongly believe that their math curriculum is suitable and beneficial to them. | | | | |

APPENDIX D: Muhasebe ve finansman bölümü öğrencilerinin matematik dersindeki motivasyonlarını etkileyen faktörler anket çalışması

Cinsiyetiniz:

Kaç yıldır öğretmenlik yapıyorsunuz?

Bu kurumda öğretmen olarak kaçınıcı yılınız?

Kısım A. Lütfen bu kısımdaki soruları kendi düşüncenize göre cevaplandırınız.

1. Muhasebe ve finansman bölümündeki öğrenci profilini kısaca anlatır mısınız?(Temel matematik bilgileri güçlüdür, Gelecekte iyi birer meslek sahibi olacaklarına güvenleri tamdır ve matematiği öğrenebileceklerine güvenleri tamdır gibi...)

3. Öğrencilerin mesleki hayatlarındaki matematik gereksinimleri(muhasebe ve finansman bölümü açısından) ile okuldaki matematik müfredatı arasında nasıl bir bağlantı vardır? Meslek liselerinin matematik müfredatı öğrencilere uygun mudur ve öğrencilerin mesleki ihtiyaçlarına tam anlamıyla cevap vermekte midir?

Kısım B. Aşağıdaki cümleleri öğrencileriniz hakkındaki gözlemlerinize ve bilgilerinize dayanarak cevaplandırınız. Başka bir deyişle ne olması gerektiğine değil, öğrencilerinizin ne yaptıklarını dikkate alınız.

| | | Kesinlikle Katılmıyorum | | | Kesinlikle Katılıyorum |
|-----|--|-------------------------|-----|-----|------------------------|
| | | (1) | (2) | (3) | (4) |
| A01 | Öğrencilerim üniversite giriş sınavları nedeniyle matematiğe çalışırlar. | | | | |
| A02 | Öğrencilerim aldıkları yüksek notlardan dolayı öğretmenlerinden ve arkadaşlarından takdir görmek için matematiğe çalışırlar. | | | | |
| A03 | Öğrencilerim kötü notlarından dolayı beni üzmemek için matematiğe çalışırlar. | | | | |
| A04 | Öğrencilerim zayıf notları yüzünden ailelerine mahcup olmamak için matematiğe çalışırlar. | | | | |
| A05 | Öğrencilerim başarı sonrası aldıkları sözlü notları ya da diğer sözlü ödüller (övgü cümleleri gibi) nedeniyle matematiğe | | | | |

| | | | | | |
|-----|--|--|--|--|--|
| | çalışırlar. | | | | |
| A06 | Öğrencilerim başarısızlığın olası kötü sonuçlarından endişelendikleri için matematiğe çalışırlar. | | | | |
| A07 | Öğrencilerim bir lise diplomasına sahip olmak için matematiğe çalışırlar. | | | | |
| B01 | Öğrencilerim iyi birer muhasebeci olmak için güçlü matematik bilgisinin gerektiğini bildiklerinden matematiğe çalışırlar. | | | | |
| B02 | Öğrencilerim kendi aralarındaki rekabetten dolayı matematiğe çalışırlar. | | | | |
| B03 | Öğrencilerim 12.sınıfta devam ettikleri staj süresinde matematiğin meslekleri için önemini fark ettiklerinden matematiğe çalışırlar. | | | | |
| B04 | Öğrencilerim arkadaşlarına, ailelerine ve öğretmenlerine zeki görünebilmek için matematiğe çalışırlar | | | | |
| B05 | Öğrencilerim akranları arasında başarısız görünmemek için matematiğe çalışırlar. | | | | |
| B06 | Öğrencilerim derste onlara verdiğim ödevleri ve problemleri tam anlayarak yapabilmek için matematiğe çalışırlar. | | | | |
| B07 | Öğrencilerim, matematik bilmenin gelecekte iş olanaklarını arttıracığına yürekten inandıkları için matematiğe çalışırlar. | | | | |
| C01 | Öğrencilerim matematiğin profesyonel hayatlarındaki önemini bildiklerinden kendi istekleriyle matematiğe çalışırlar | | | | |
| C02 | Öğrencilerim, kendilerinin muhakeme ve düşünce becerisini geliştirdiğine inandıkları için matematikle uğraşırlar. | | | | |
| C03 | Öğrencilerim matematiğin estetik güzelliğinden (sanatsal yönü gibi)etkilendikleri için matematiğe çalışırlar. | | | | |
| C04 | Öğrencilerim matematiğin gerçek hayattaki sık kullanımından etkilendikleri için matematik çalışırlar. | | | | |
| C05 | Öğrencilerim matematiğe kişisel olarak ilgi ve merak duyduklarından matematiğe çalışırlar. | | | | |
| C06 | Öğrencilerim matematik temel bir bilim olduğu için kişisel meraklarından dolayı matematiğe çalışırlar. | | | | |
| C07 | Öğrencilerim meslek lisesi matematik müfredatının kendileri için uygun ve yararlı olduğuna yürekten inandıkları için matematik çalışırlar. | | | | |