FROM LITTLE ACORNS TO MIGHTY OAKS: SELF-REGULATION STRATEGIES OF THE TOP RANKING SCIENCE HIGH SCHOOL STUDENTS IN TÜRKİYE AND FACTORS PROMOTING THESE STRATEGIES

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ABSTRACT

FROM LITTLE ACORNS TO MIGHTY OAKS: SELF-REGULATION STRATEGIES OF THE TOP RANKING SCIENCE HIGH SCHOOL STUDENTS IN TURKEY AND FACTORS PROMOTING THESE STRATEGIES

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The present study investigated the SRL strategies used by students studying at top ranking science high schools of Türkiye, the domain specificity of the self-regulated learning process, SRL-related beliefs of teachers, and instructional as well as student-related factors promoting the development of SRL strategies. The study had a mixed-method design. Using the cluster sampling method, quantitative data of the study were collected via The Self-regulatory Strategies Scale and via Self-Regulated Learning Teacher Belief Scale. Qualitative data of the study were collected from the students and teachers via interviews. In total, the SRSS was administered to 857 students, while SRLTB was administered to 106 teachers. Besides, 15 teachers and 15 students were interviewed. The results of the study showed that SRL strategies such as goal setting, forming multiple motivational beliefs, strategic planning are the first steps of SRL. In addition, the findings of the study showed that SRL has both general and domain-specific aspects. Also, the teachers working at these schools were found to have

advocating beliefs of self-regulation. In line with this result, it was revealed that there are several instructional factors affecting the development of SRL, such as teaching SRL skills, keeping a record of students' learning, building rapport with students, and generating academic interest in students. Finally, student-related factors such as having parents or siblings coaching the SRL process were found to be effective in the promotion of SRL. Also, self-efficacy beliefs and critical thinking skills were found to be influential in the SRL development.

Keywords: Self-regulation, Self-regulated Learning strategies, Teacher beliefs in Self-regulation, Science High Schools

ÖZ

TOHUMDAN AĞACA: TÜRKİYE'NİN EN YÜKSEK PUANLA ÖĞRENCI ALAN FEN LİSELERİNDE OKUYAN ÖĞRENCİLERİN ÖZDÜZENLEME BECERİLERİ VE BU BECERİLERİ GELİŞTİRMELERİNDE ETKİLİ OLAN FAKTÖRLER

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Bu çalışma Türkiye'nin en başarılı fen liselerinde okuyan öğrencilerin kullandıkları özdüzenleme stratejilerini, özdüzenlemenin alana özgü bir beceri mi yoksa genel bir beceri mi olduğunu, Türkiye'nin en başarılı fen liselerinde çalışan öğretmenlerin özdüzenlemeye dair görüşlerini ve özdüzenleme becerisini geliştiren hem öğretimle ilgili hem de öğrenci ile ilgili faktörleri araştırmıştır. Bu çalışmada karma araştırma yöntemi kullanılmıştır. Küme örneklemesi yöntemiyle örneklem belirlenmiştir. Bu örneklemden nicel veriler Özdüzenlemeli Öğrenme Stratejileri Ölçeği aracılığı ile öğrencilerden ve Öz-Düzenlemeli Öğrenme Öğretmen İnanç Ölçeği aracılığı ile öğretmenlerden toplanmıştır. Araştırma da ayrıca nitel veriler de öğrenciler ve öğretmenlerle görüşmeler yapılarak toplanmıştır. Özdüzenlemeli Öğrenme Stratejileri Ölçeği 857 öğrenciye, Öz-Düzenlemeli Öğrenme Öğretmen İnanç Ölçeği 106 öğretmene uygulanmıştır. Ayrıca, 15 öğrenci ve 15 de öğretmen ile de görüşmeler yapılmıştır. Elde edilen bulgular göstermiştir ki hedef koyma, bu hedefe yönelik çeşitli

motivasyon sebepleri yaratma ve stratejik planlama yapma özdüzenlemeli öğrenmenin ilk adımlarıdır. Ayrıca, araştırmanın sonuçları göstermiştir ki özdüzenleme hem alana özgü hem de genel özellikler taşımaktadır. Ayrıca öğretmenlerin özdüzenlemeli öğrenme konusunda destekleyici fikirlerinin olduğu, buna paralel olarak da öğretimin özdüzenlemeyi teşvik edebildiği saptanmıştır. İlkokul, ortaokul ve lise öğretmenlerinin uyguladığı öğrencinin gelişimini takip etme, öğrencide akademik merak uyandırma, öğrenciye özdüzenleme becerileri öğretme ve öğrenci ile olumlu ilişkiler kurma gibi yöntemlerin özdüzenlemeye katkıda bulunan önemli faktörler olduğu belirlenmiştir. Ayrıca çocuğunun özdüzenleme becerisi geliştirmesine rehberlik eden ilgili bir ebeveynin ya da özdüzenleme becerilerine sahip bir kardeşin varlığı ve öğrencinin geldiği sosyal çevrenin özdüzenlemeyi geliştirici faktörler olduğu bulunmuştur. Özyeterlik algısının ve eleştirel düşünme becerisininde özdüzenlemeyi olumlu etkileyen faktörler olduğu saptanmıştır.

Anahtar Kelimeler: Özdüzenleme, Özdüzenlemeli Öğrenme Becerileri, Öğretmenlerin Özdüzenleme Becerisi Hakkındaki İnançları

To my beautiful mother, whose light still illuminates my path…

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LIST OF ABBREVIATIONS

MONE Ministry of National Education

SRL Self-Regulated Learning

SRLTB Self-Regulated Learning Teacher Belief Scale

SRSS The Self-regulatory Strategies Scale

CFA Confirmatory Factor Analysis

EFA Explanatory Factor Analysis

"The moment we recognize that the self is not something ready-made, but something in continuous formation through choice of action, the whole situation clears up."

John Dewey, Democracy and Education (1916, p.192)

CHAPTER 1

INTRODUCTION

This chapter firstly provides a background to the study. Then, it describes the purpose and research questions of the study, significance of the study, and definition of the terms.

1.1. Background to the Study

Self-regulation is an essential part of what we choose to do and what we choose not to do or who we choose to be and who we avoid becoming. Every day we plan our day, and we regulate the self. In a very basic description of self-regulation brought forward by Vohs and Baumeister (2016) stated that self-regulation subsumes many processes in which the human psyche controls our actions and the inner processes linked with these actions. It is a key factor in putting our internal instincts into practice.

Self-regulation is often used interchangeably with self-control. However, a distinction was made between these two in the literature: self-control is more about deliberate exercise of control over impulses, while self-regulation is predominantly associated with behaviors targeted towards goals and circles of feedback. Also, self-regulation can be defined as a behavior with a sense of regularity rather than being a one-shot act. As also stated by Vohs and Baumeister (2016), self-regulation can be found in the working principles of nature. To illustrate, homeostasis can be seen as the biological foundation of self-regulation. Homeostasis, coming from the Greek words for "same" and "steady," can be defined as processes which living things go through to keep adequately stable conditions necessary for survival (Rodolfo, 2000). However, homeostasis does not mean keeping the body in fixed conditions. It implies much more than that: maintaining an optimal status within the conditions of the living for survival.

In other words, homeostasis holds important physiological factors within an acceptable range of values (Lanese, 2019). For instance, the human body has a stable body temperature of about 98.6 degrees Fahrenheit (37 degrees Celsius). When our body is overheated, thermos-sensors in the skin and brain convey an alarming message, which starts a chain reaction that causes the body to sweat and flush. When we feel cold, our body reacts by shivering, and reducing blood circulation to the skin. In addition to this physiological reaction, humans also adjust their behaviors in accordance with the feedback coming from outside. We look for shade or take off a layer of our clothes when we feel overheated (Lanese, 2019). This manifests how we regulate our behavior. Although this is one of the manifestations of self-regulation, self-regulation is actually more than that. It encompasses many behaviors through which our inner self exercises control on our behavior. There are both conscious and unconscious patterns of self-regulation; in the field of social sciences, mostly conscious processes are under scrutiny.

While studying this conscious process, there are two paths that researchers can take. One of them is studying the theory of self-regulation and the other is the practice. The theory of self-regulation has been explored by psychologists so as to enlighten how the self performs control over itself and makes alterations if needed. This also includes how one's social and physical environment forces him/her to adapt. On the other hand, research focuses on the practice of self-regulation; it mostly deals with how the regulation of self- manifests itself in daily life. As suggested by Magno (2009), self-regulation can be practiced in numerous areas of life, such sports, health, industrial settings, and in managing one's emotions. Regarding the practice of self-regulation, Vohs and Baumeister (2016) underline that many social and personal problems are closely linked with the failure to perform self-regulation. Engaging in risky activities, overconsumption, alcoholism, smoking, and any kind of addiction might be presented as examples of unsuccessful attempts at self-regulation (Magar, Phillips, & Hosie, 2008).

According to Borkowski and Burke (1996), the development of self-regulation starts once children are instructed on the use of a learning strategy for the first time. They gradually acquire information related to the attributes of that particular strategy. Then

children find out different learning strategies. Employing these strategies in various contexts help them discover more strategies in different settings. Self-regulation develops when children became capable of selecting the most effective strategy among the others and observing their own performance. According to Schraw (1998), people go through the planning, monitoring and evaluating process while they are regulating their behaviors, and they ask certain questions in each stage. Some example of planning questions are: "What kind of a task is this? What is my goal and how will I know I have reached it? How motivated am I to perform the task, and how can I increase my motivation if it's low? How much time and how many resources will be necessary? What do I already know about the topic?" A couple of examples of monitoring questions are: "Am I sure I know what I am doing? Does my approach to the task make sense? How well are my strategies working?" and some example of evaluating questions are: "How well did I achieve my goal? How well did I master what I set out to learn? How well did I avoid sources of interference and stay on task? What approach or strategy worked well? What didn't work? What do I need to do differently when taking on a similar task? What were the most important points I learned? What am I still having trouble understanding?"

When we consider self-regulation in the context of education, we can state that research deals with how mental processes taking place in the mind impact learners' acts to shape their learning processes and regulate their learning environment in accordance with the goals that they have. According to Pintrich (2005), "Self-regulation is an active, constructive process whereby learners set goals for their learning and then attempt to monitor, regulate and then to control their cognition and behavior guided and constrained by their goals and contextual features in the environment" (p.453). Thus, Pintrich (2005) emphasizes goal directed behavior and the role of the learner to tailor their environment depending on their goal. Similarly, Zimmerman (1994) underlines that self-regulated learning consists of various activities such as modifying, instigating and sustaining. Schunk (2005) gives examples of these activities such as attending to instruction, processing of information, rehearsing and linking new pieces of information to already existing ones, having the

belief that one is capable of learning, and building productive social relationships and work places.

Self-regulated learning which is often used interchangeably with self-regulation covers all the aspects and mental processes that have been mentioned above. In addition, other writers add more dimensions to self-regulated learning. Heikkala and Lonka (2006) indicate that a self-regulated learner maintains their motivation to achieve the goals that s/he set and s/he takes the responsibility for their own learning. Similarly, Kadıoğlu et al. (2011) underscores that enabling students to develop self-regulation does not only lead to better achievement in content knowledge, it also helps them to acquire study skills, social skills and develop inner sources of motivation which are bound to bring about people with inspiration to learn throughout their lives. Therefore, limiting self-regulation to just cognitive and metacognitive strategies which learners utilize throughout their learning stages would be excluding some crucial driving processes. Another perspective put forward by Kaplan (2008) on this issue suggests that metacognition, self-regulation, and self-regulated learning are not separate concepts, but rather they are the subtypes of the same general concept called self-regulated action. This tells us that there is not one set of self-regulated actions which assist learners in regulating their behavior in every context. Instead, there are types of self-regulated actions which fit into different contexts for different learners and for different tasks as well as different domains. Also, learners are also bound to regulate their motivation to achieve and the efforts they make during the processes. Thus, they need to employ motivational and volitional strategies to maintain their motivation, to live up to social expectations (e.g. being a learner who takes the responsibility for their learning or being an open-minded member of a group) or to deal with the troubles (various distractions or further difficulties) they encounter on their way to attaining their goals (Boekaerts & Cascallar, 2006). Besides, such learners are able to create feedback loops thanks to which they reflect on their strategies and adjust their behaviors (Butler & Winne, 1995). While self-regulation skills are associated with such positive gains particularly goal-directedness, poor self-regulation skills are often linked with impulsive behavior, avoidance, maladaptive behavior, low self-efficacy and low motivation to set goals and work for them (Borkowski & Thorp, 1994;

Zimmerman,2000). Similarly, self-regulation is also regarded as a temperament (Duckworth & Carlson, 2013) and in taxonomies of childhood temperament, self-regulation is customarily derived from two factors which can be considered as more reactive and less voluntary in essence, such as negative emotionality and surgency (Rothbart & Rueda, 2005).

No matter how self-regulation is defined, it is essential to underline that it has a closely bonded relationship with learning. For this reason, Zimmerman and Schunk (2011) underline that when self-regulation is connected with academic learning, students acquire skills to utilize self-regulation processes in a learning context. Therefore, it carries a great deal of importance to teach students self-regulation skills such as goal-setting, and using strategies to remember new information or creating time-tables. Recent studies indicate that enriching learning does not only mean mastering the class content. It also means acquiring and improving skills such as study skills and social skills, as well as motivational orientation to achieve goals. As stated by Flook et al. (2015), self-regulation skills are strong predictors of positive learning outcomes. Setting proper goals and regulating behavior to attain that goal form the essentials for school readiness and creating positive social relationships (Blair, 2002). However, they are not usually a part of the school curriculum. These all call for more research on self-regulation in curriculum areas as well as self-regulation in the school context.

Considering the discussions given above, it is appropriate to underline the importance of self-regulation strategies in the school context. Academically successful students often employ a variety of self-regulation strategies which help them to manage their time and sources effectively in order to reach their predetermined goals. The present study examines such strategies and explores whether these strategies differ from one field of study to another as well as the possible student related and instruction related factors which have an impact on their development.

1.2. Purpose and Research Questions of the Study

This study has two major purposes: The first purpose of the study is to uncover the self-regulation strategies of students who study in the top science high schools of

Türkiye. These schools accept students based on their high school entrance exam scores, and the schools which accept students with higher scores have been selected. Students studying at such schools are expected to have certain self-regulation skills as they need to master the content of the high school entrance exam in order to get a high score. Thus, this study explores the self-regulation strategies helping them to achieve academic success. Furthermore, the study investigates SRL-related beliefs of teachers and if SRL strategies vary from one course to another, which in turn provides implications for the discussion about self-regulation as a general concept or domain-specific one. Furthermore, the current study explores the student and instruction-related factors which facilitate the process of development of self-regulation strategies so as to present a deeper understanding of this concept.

Drawing upon the discussions given above, the following research questions are answered in this study:

1. What are the SRL strategies of students studying at the top ranking state high schools of Türkiye?
    - Does the use of self-regulation strategies of students vary depending on the course?
2. What are the beliefs of teachers working at the top ranking science high schools of Türkiye regarding self-regulated learning?
3. What are the instruction related factors promoting the SRL strategies of students studying at the top ranking state high schools of Türkiye?
4. What are the student related factors promoting the SRL strategies of students studying at the top ranking state high schools of Türkiye?

1.3. Significance of the Study

Historically, research on individual differences that are linked with school success has centered on general intelligence, but this has recently been changed, as other factors such as self-efficacy and self-regulation have attracted a great deal of attention (Duckworth & Carlson, 2013). As underscored by Zimmerman (1989), "learning is not something that happens to students, it is something that happens by students" (p. 22). A great deal of research shows that a learner's ability to regulate attentional,

behavioral, and emotional impulses leads to academic achievement in school (e.g., Denham et al., 2012; Duckworth & Carlson, 2013; Nota et al., 2004; Schunk, 2005; Schunk & Zimmerman,2012). However, the essential questions to ask so as to explore the SRL process are "What key strategies do students need to guide and direct their own learning process? Why do some students self-regulate the learning process and other do not? What cues in the learning environment trigger self-regulation strategies? What can teachers do to help students self-regulate their learning, motivation, and effort in the classroom?" (Boekaerts & Cascallar, 2006 p.199). As stated by Boekaerts and Corno (2005), research on self-regulation could most effectively serve instruction if researchers and practitioners analyze students' self-regulation processes within the framework of their pertinent goals and the way they perceive and interpret the positive and negative factors in their environment which affect their learning. These goals and the learning environment are reflected in both conscious and unconscious choices that students make within the classroom or during any learning opportunity they take. That's why making a report of these environmental factors that trigger self-regulation process can help teachers to facilitate these mental representations in more students. For this reason, this study will contribute to research by revealing self-regulation strategies employed by students studying at the top ranking high schools of Türkiye and student related as well as school related factors which have assisted them in developing these strategies. Although numerous studies have been conducted on the use of self- regulated learning processes in laboratory situations (e.g., Bandura & Schunk, 1981; Mischel & Mischel, 1983), few efforts have been made to explore the role of self-regulated learning processes in naturalistic settings (Zimmerman & Pons, 1986). Thus, this study is going to provide insights on the measurement of self-regulation in naturalistic settings of students and inquire about the strategies that they use in such settings.

Research on self-regulation has accumulated in certain areas with the use of certain samples. As stated by Schunk (2005), self-regulation research has accumulated in European and North American settings. However, there is an obvious need to conduct such research across cultures. Research with diverse populations is certainly helpful in revealing how well motivational and self-regulation principles can be established

across student populations (Pintrich & Zusho, 2002). Because of the differences in contexts and the curricular approaches that students might be exposed to in a range of countries, more research is needed on the use of self-regulatory strategies in various places to ascertain the generalizability of theoretical models and practical uses of self-regulation (Olaussen & Braten, 1999).

In addition, there is plenty of research on the self-regulation skills of children as a predictor of success, so several studies take pre-school, primary, and elementary school children as their samples (see Paris & Oka, 1986). However, the report of the Carnegie Council on Adolescent Development (1989) underlines that "young adolescents face significant turning points. For many youths 10 to 15 years old, early adolescence offers opportunities to choose a path toward a productive and fulfilling life. For many others, it represents their last best chance to avoid a diminished future" (p. 8). Thus, conducting more research in this age group is critical. Also, empirical studies in this field focus on interventions of self-regulation and training of self-assessment as well as reflection. For this reason, there is a need for studies with samples of a different age group - high school students in this case - so as to fully explore the self-regulation concept. Moreover, rather than seeing the results of a particular training, this study deals with already existing self-regulation strategies and their development process together with the factors affecting this process, such as motivation, methods of learning, use of time, physical environment, social environment and performance (Zimmerman & Risemberg, 1997). As Dembo and Eaton (2000) set forth, amendments of curriculum and improved teacher education are essential elements in the improvement of students' learning process, but the role of the student in facilitating his or her own learning should not be ignored. Therefore, this study can both contribute to the literature by filling a niche and also help the practitioners work on student related and school related factors so as to facilitate the self-regulation processes of students. The study also investigates the beliefs of teachers regarding self-regulated learning. These findings of the study are also significant to give meaning or reinterpret teacher behavior and have potential to contribute to research guiding the curriculum of the faculties of education.

In addition, there are not many studies in the existing literature focusing on successful high school students who are specializing in natural sciences, so the results of this study are expected to be enlightening, revealing the self-regulation strategies and school and student related factors affecting such strategies. As stated by Zimmerman (2002), so far we have not assisted students in acquiring self-regulation skills, but still we are expecting them to take the responsibility for their own learning. For this reason, a detailed report of self-regulation strategies and factors affecting the development of these strategies is likely to be helpful for practitioners so as to guide students to the path taken by more self-regulated ones and to enhance the contributing factors of this process. In addition, the research on the SRL has not still been completed to allow for a deep understanding of self-regulation as a general or domain-specific subject. Alexander, Dinsmore, Parkinson, and Winters (2011) call for attention to this issue and states that:

> Empirical research on SRL has not systematically or seriously regarded the potential effects of domains or domain-specific tasks on individuals' regulation of their cognition, motivation, or emotions…we hold that this lack of domain-specific attention within the SRL empirical research demands immediate and considerable attention if educational researchers are going to achieve a deeper understanding of the very nature of self-regulation and its role in human learning and development (p. 403).

As stated by Alexander et al. (2011), there is a need to understand the complex phenomena of SRL and determine if it is a general or domain-specific concept. This study addresses this problem by collecting data from the top science high schools in Türkiye and provides a detailed understanding of this concept with the help of extensive data collected from academically successful science high school students.

Finally, self-regulation studies involve either qualitative or quantitative data or focus on a certain field only, such as biology and chemistry. However, this study presents a broader perspective on self-regulation through both qualitative and quantitative data and touches upon several academic subjects. Thus, it offers a comprehensive report on the complex phenomena of self-regulation.

1.4. Definition of the Terms

Science High Schools are public boarding high schools in Türkiye with a curriculum concentrated on natural sciences and mathematics for the top-ranking students. The first science high school in Türkiye was established in 1964 in Ankara; later more science high schools were opened in different cities, particularly to raise scientists.

Core Academic Subjects are the courses taught in science high schools of Türkiye namely Turkish Language and The Literature, Math, Foreign Languages (English and German), History, Geography, Chemistry, Physics, Biology, Religious Education and Ethics, Philosophy. Students are tested via formal assessment on these subjects.

Self- regulated learning refers to a cyclical process in which students plan, monitor and reflect on their learning process with the help of certain strategies in order to reach a goal.

Self-regulation strategies can be defined as some methods used by students to choose, monitor and utilize learning strategies.

Instruction-related factors refer to circumstances affecting the development of self-regulation strategies while teachers organize their time and activities so as to teach certain content and engage students with that content.

High school entrance exam is a test which can be taken by any student who successfully completes eight years of basic education. In this test, students are tested on Turkish, Math, Social Sciences, Natural Sciences, English, and Religious Education and Ethics. Students can go to a specific high school with the score they obtain from this exam.

CHAPTER 2

THE LITERATURE REVIEW

This chapter provides a review of relevant the literature under two section main sections and several subsections. In the first section, the theories of self-regulation are introduced. Then as a subsection of this part, models of self-regulated learning which were created based on the theories of self-regulation are explained as well as a discussion of these theories and models benefited in this study. In the second section of the review of the literature chapter, present the literature on self-regulated learning is reported. Studies on self-regulation and success, student related factors affecting self-regulation, instruction-related factors affecting self-regulation and empirical research on self-regulation are respectively reviewed. Finally, a summary of review of the literature is provided.

2.1. Theoretical Background of Self-Regulation

Regarding the theoretical background of self-regulation, Zimmerman and Schunk (2011) present five theoretical points of view on self-regulation which are Operant Theory, Information Processing Theory, Developmental Theory, Social Constructivist Theory, and Social Cognitive Theory. Before moving into the models of self-regulation, it is important to offer an analysis of them. Operant theory exemplifies self-regulation in accordance with the work of Skinner (1953). Self-regulation within the framework of Operant theory involves learners' decision making regarding the behaviors to regulate, determine discriminative stimuli and make a performance evaluation in accordance with the standards considering reinforcements. This process subsumes self-monitoring, self-instruction, and self-reinforcement (Zimmerman & Schunk, 2011). Thus, the learner makes a choice among different ways of acting,

taking the reinforcements and prospective reinforcers into consideration (Mace et al., 1989).

When it comes to self-regulated learning within the framework of Information Processing Theory, Gitomer and Glaser (1987) point out that from this perspective, self-regulation is about metacognitive awareness and this awareness includes many other sub-processes. Some of these processes are task-awareness, procedural knowledge and problem-solving production systems, use of learning strategies and comprehension monitoring (Anderson, 1990; Zimmerman & Schunk, 2011).

Regarding SRL, developmental theories reveal that self-regulation is a sequence of cognitive changes in learners' capability of controlling their thoughts, feelings and actions (Schunk & Zimmerman, 1994). Kopp (1982) states that some ways of act such as starting and ending certain type of behaviors, considering socially accepted norms while acting, adjusting actions to achieve a goal and modifying the frequency and density of behaviors are examples of self-regulation. However, while Kopp (1982) offers a chain of developmental stages and cognitive mediators for self-regulation, Schunk and Zimmerman (1997) propose that self-regulation starts with social sources and then it is converted to self-sources.

Table 1

Social Cognitive Model of the Development of Self-Regulatory Competence

Level of Development	Social Influences	Self-Influences
Observational.	Models.	
	Verbal description.	
Emulative.	Social guidance.	
	Feedback.	
		Internal standards.
Self-controlled.		Self-reinforcement.
Self-regulated.		Self-regulatory processes.
		Self-efficacy beliefs.

Note. Adapted from Self-regulation and learning in Reynolds, W., & Miller, G. (2003). *Handbook of psychology (Vol. 7): Educational psychology,* (pp.59-75) by Schunk, D. H., & Zimmerman, B. J., 2012. New York: Wiley. Copyright 2013 by Wiley.

As seen in Table 1, self-regulation is initiated with the help of social causes and then it starts to develop in one's self. As stated by Zimmerman and Rosenthal (1974), learners initially receive input on self-regulation skills through teaching, social modeling, task structuring, and encouragement. At this stage of learning, learners get familiar with essential strategies of self-regulation through modeling. This is in line with social cognitive theory of Bandura (1986). In the 4 levels of self-regulation shown in Table 1, people develop to be more self-regulated learners by first observing certain skills, then practicing such skills which are called emulation, later making them a part of their internal control, and eventually utilizing them adaptively, which is the self-regulation stage. As stated by Schunk and Zimmerman (1997), this approach could facilitate instruction to lead students to self-regulating academic learning despite the fact that it is based on socialization studies. Nevertheless, in order to perform such skills and to reach motoric accuracy, learners need guidance, feedback, and social reinforcement during practice (Schunk & Zimmerman, 2012). On the other hand, although it is not externally communicative (Fuson, 1979), private speech has been

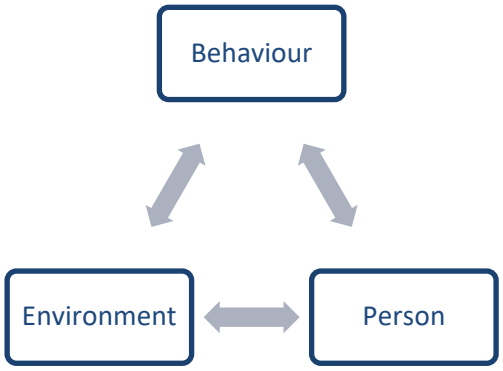
reported to be a contributing factor in developing self-regulation (Berk, 1986; Frauenglass & Diaz, 1985). As stated by Luria (1961) through the ages of four and five, a child's private speech reaches the level of controlling motor acts by starting, guiding or stopping them and this private speech plays a self-regulatory role which marks a period of self-regulation within the framework of developmental theories. However, from the social constructivist perspective, self-regulation is seen as the stages in which learners cultivate beliefs and theories related to their skills and competencies, evaluate tasks in terms of their structure and level of difficulty, and develop ways and strategies to achieve their goals (Paris & Byrnes, 1989). Thus, it is possible to state that Social Constructivist theories of Self-regulation are based on theories of cognitive development (Schunk & Zimmerman, 2012). According to Paris and Byrnes (1989), these theories of development have essential premises. These theories indicate that people are innately hardwired to explore, learn, create meaning and establish hypotheses based on their prior experiences. Thus, they create mental representations in their minds. While younger children's representations are based on action and sights, as they go through later developmental stages, they create representations based on verbal codes such as linguistic units or mathematical notations in their minds. In addition, while people are exposed to physical experiences, social guidance, and new information, they keep reorganizing their internal structures which is a never ending process. These theories underline that learning both involves maturation and prior experiences, and it is optimized when given input is adjusted to the potential of the learner and their readiness (Schunk, & Zimmerman, 2012).

When it comes to Social Cognitive Theory, the approach to self-regulation takes a different path. This route is taken considering the Social Cognitive Theory of Bandura (1986, 2001). Bandura's social cognitive theory regards human functioning as a series of reciprocal interactions between individual influences such as thoughts and environmental features, and behaviors. Within this framework, modeling is a key variable in Bandura's theory and it is affirmed to enhance students' self-efficacy and self-regulation. As stated by Schunk (1987), modeling can be defined as the process in which individuals emulate their thoughts, beliefs, and behaviors once they observe the performance of one or more models. Modeling is significant to shape thoughts,

behaviors or even skills. For this reason, it is highly likely to impact both self-efficacy and self-regulation processes. Once a learner observes that the model can achieve a task by performing certain behaviors, their belief that they can have the same achievement is enhanced and they can also regulate their behaviors to complete the same task. At this point, it is essential to put out forward the definition of self-efficacy offered by Bandura. Self-efficacy is specified as learners' perceived capabilities for learning or performing actions at designated levels by Bandura (1997). Self-efficacy and self-regulation are interwoven processes as self-efficacy is hypothesized to impact the selection of activities, the amount of endeavor, tenacity, and success (Bandura, 1997; Schunk, 2001). Thus, students who possess higher self-efficacy are likely to stick to the tasks at hand, show persistence and endure longer once they face challenges compared to those with lower self-efficacy skills. As stated before, Bandura underlines that person, environment and behavior are reciprocal relationship. This reciprocal determinism lies at the center of Bandura's theory and sheds light on how environment, behavior and person impact one another and keep rebuilding each other. This is also valid for self-efficacy and self-regulation. To start with, learners with higher self-efficacy can keep studying even in noisy environments and increase their concentration even more, which might set an example for how a learner can affect their environment. Moreover, encouraging feedback can increase the self-efficacy of a learner which offers an example of how environment can have an impact on self-efficacy. Furthermore, a learner can feel more efficacious after solving a difficult math problem and might start to feel even more motivated to solve another difficult one. These all exemplify the reciprocal relationship mentioned above. Figure 1 presents a demonstration of this relationship offered by Bandura (1986).

Figure 1

Bandura's Model of Reciprocal Interactions



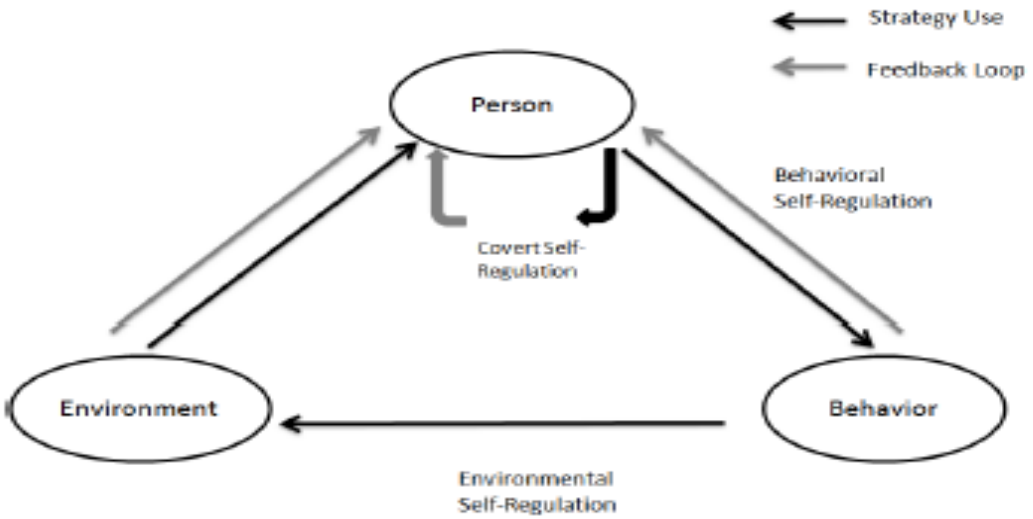
Note. This figure was created considering *Social foundations of thought and action by Bandura, A. Englewood Cliffs, NJ, 1986.* Copyright 1986 by Englewood Cliff.

Bandura (2001) indicated that people carry the desire to have a control over important components of their lives and this reciprocal relationship demonstrates how people can actually modify their behaviors and environments with their thoughts and beliefs. These factors are essential for both self-efficacy as stated before and also self-regulation. As stated by Zimmerman (1994, 1998) the development of self-regulation, which takes place in six different areas namely methods, motives, time, outcomes, social environment and physical environment depends on contextual factors as well. Schunk and Zimmerman (2012) add that self-regulation is only an achievement when students have the freedom to make their own choices in at least one of these areas. Otherwise, students might reach the desired learning level, but the locus of control is external. Similarly, there is research indicating that sub-processes of self-regulation, which are stated as self- observation, self-judgement and self-reaction (Bandura, 1986; Kanfer & Gaelick, 1986; Karoly, 1982) work collectively with environment (Schunk & Zimmerman, 2012). These sub processes interact both with the environment and with each other. Locke and Latham (1990) state that as long as learners believe that they have the capability to improve themselves, higher goals lead to better performance and they tend not to be affected by negative evaluations. While going

through these processes, one might evaluate their performance considering their environment and also make further observations about a certain act so as to determine the criteria of performance in a more detailed way and to adjust their behavior which is also called self-judgement. This might lead to the increased self-efficacy and enhanced self-regulation as it gives the learner a sense of progress. Similarly, self-reaction has a tremendous effect on motivation to attain goals (Schunk & Zimmerman, 2012). Thus, within Social Cognitive Theory, self-regulation and environment have a reciprocal relationship which results in a cyclical process. This is also compatible with what Bandura (1986) stated. To elaborate, there is a triadic cyclical relationship among environment, behavior and person. The regulation of the person can be identified as monitoring and adopting cognitive and affective states while self-regulation in terms of behavior can be identified as self-observation; and adjusting performance such as reviewing learning strategies and self-regulation in terms of environment can be identified as observing and adapting environmental conditions (Zimmerman, 2005). As stated by Bandura (1986), these factors can be both separable and overlapping and in some cases one impact might be more vigorous than the other, which reinforces the notion that self-regulation is contextual (Schunk, 2001). Figure 2 illustrates this process:

Figure 2

Triadic processes of self-regulation



Note. Adapted from Attaining self-regulation: A social cognitive perspective in M. Boekaerts, P. R. Pintrich, & M. Zeidner (Eds.), *Handbook of self-regulation* by Zimmerman, 2005 p.15. Copyright 2005 by Elsevier Academic Press.

As seen in Figure 2, self-regulation is in a reciprocal relationship with environment, which is likely to lead some behaviors to be regulated more than others. This approach differs from both developmental theories and information processing theories as it analyzes self-regulation in a context rather than isolated processes within the self. Zimmerman (2005) puts emphasis on self-generated thoughts and cyclical process and acts planned to attain certain goals regarding self-regulation. Social Cognitive Theory considers all the processes within the context that they take place.

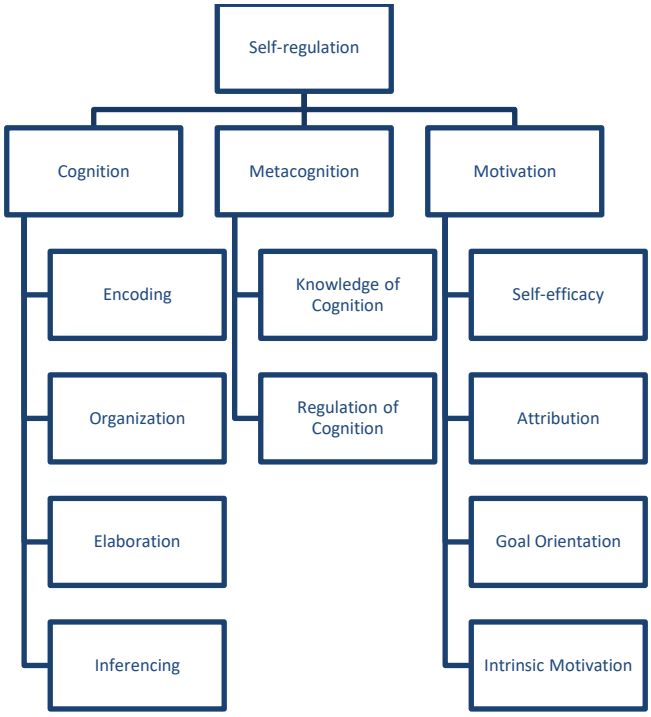
While reviewing the theories of self-regulation, it is also vital to note the importance of motivation, metacognition, and cognition. As stated by Schraw, Lehman and Kauffman (2006), each of these elements is crucial in the process of self-regulation and these three should function properly so as to achieve self-regulation. Cognition refers to certain skills which are required to encode, store and recall pieces of information. Metacognition involves the skills of learners to monitor and give meaning to cognitive operations. Motivation encompasses beliefs and attitudes which determine

the utilization of cognitive and metacognitive skills. People who have a high motivation to employ metacognitive and cognitive skills, but lack the necessary knowledge of them, are likely to be unable to reach high levels of self-regulation. Similarly, the ones who have higher levels of cognitive and metacognitive skills, but have no motivation to employ them, are likely to fail to self-regulate (Zimmerman, 2000a).

Schraw et al.(2006) also presented sub processes of motivation, metacognition, and cognition. They can be seen in Figure 3:

Figure 3

Components of Self-regulated Learning



Note. This figure was recreated based on Self-regulated learning by Schraw, G., Kauffman, D. F., & Lehman, S., 2006. *The encyclopedia of cognitive science,* p.1064

As seen in Figure 3, self-regulation is a complex process in which many sub-processes are intermingled. The process of cognition starts with encoding information which refers to the processing of information so as to transfer it from working memory to

long-term memory. This is necessary since working memory has a limited capacity (Neath, 1998). Organization is identified as the process of organizing encoded information within long-term memory. Many researchers share the notion that pieces of information are stored in long-term memory in the form of schemata. This helps us to organize, store and recall information easier (Neath, 1998). An example of such organization can be the way we learn some historical events such as World War I. The information related to WWI can be organized in our brain in three files or schemata. These can be the reasons for WWI, the countries that fought in WWI and the consequences of WWI. These help us to keep the information in an organized manner and recall it easier when needed. However, elaboration is also needed to keep the information in the long-term memory. These can be achieved by linking the information with the already existing pieces of knowledge or rehearsing it over and over. These rehearsals can take place in the form of maintenance rehearsal as well as elaboration rehearsal. Maintenance rehearsal can take place by repeating the information over and over, such as repeating the names of countries that fought in WWI. In order to do elaboration rehearsal, however, learners can learn the countries that started the WWI and keep learning the ones which joined later for various reasons, learning both the countries and their reasons for taking part in. The last element of cognition is inferencing which is a skill considered vital by cognitive researchers. Because inferencing requires learners to go beyond what is told to them or what they read and to reach a new understanding, it is a crucial skill for self-regulation.

When it comes to metacognition, we have two sub categories, which are knowledge of cognition and regulation of cognition. Knowledge of cognition can be described as what we know about our cognition. Knowledge of cognition can be divided into three branches. These are declarative knowledge, procedural knowledge and conditional knowledge. The extent that we become aware of the things that influences our performance can be defined as declarative knowledge. When learners have the knowledge of their restraints and boundaries, and when they take action considering these, we can state that they are learners with declarative knowledge. Procedural knowledge can be called learning strategies as well. They are the tactics that learners employ when they want to master a certain content. Use of mnemonic devices can be

an example of this. Finally, conditional knowledge can be specified as the knowledge of when and why to utilize a certain strategy. These conditions exist in the minds of learners and learners self-regulate by using a certain strategy at a certain time. Alexander et al. (1995) state that knowledge of cognition develops later, so adults are likely to have a better knowledge of cognition than children or adolescents. However, as suggested by Butler and Winne (1995) knowledge of cognition may not be always explicit, so adults may fail to use this knowledge. In many situations, it is implicit and is used without much thought given to the process.

When it comes to cognition of regulation, Schraw and Moshman (1995) set forth three elements of this process which are planning, monitoring and evaluation. Research suggests that these processes may be automated in many cases and learners may not be doing them at a conscious level at all times (Pressley & Ghatala, 1990). The planning stage refers to setting goals and considering the sources to achieve this goal. Goals may change during the process and new goals can be set considering the available resources. Monitoring simply refers to watching one's performance and noticing ups and downs of one's conduct. Last but not least, evaluation means checking on the results of the performance and taking necessary actions considering these assessments.

The last component mentioned by Schraw, Lehman and Kauffman (2006) is motivation. As stated earlier motivation is affected by self-efficacy. In other words, beliefs in one's capability to achieve certain goals. Schraw, Lehman and Kauffman (2006) put forward a different perspective of enrichment of self-efficacy and declare that vicarious learning and modeling have a positive impact of the enhancement of self-efficacy of learners. They indicate that vicarious learning, which takes place when a learner watches others perform or display their knowledge on a particular subject, is auspicious for their self-efficacy. This is simple because they go through a kind of learning process without the pressure of performance. Modeling is also a contributing factor to the enrichment of self-efficacy because it provides inspiration to the learner by making the task at hand look doable. Modeling generally involves making the task more manageable by dividing it into steps, so achieving each step can contribute to the self-efficacy of the learner. Bandura (1997) emphasizes that modeling is particularly

important as it conveys the message that the task is achievable. Peer models have an even better impact as they display the performance of a task at a closer level (Schunk, 1996).

Another component of motivation is attribution, which describes the causal relationship we build between events. When we consider the case of getting a poor score from an exam, we can observe that one student may put the blame on teacher and the other may think this has resulted from their inability to study enough. This tells us that not just what we go through, but also how we portray what we go through, matters (Graham & Weiner, 1996). Weiner (1986) elaborates on the attributions and states that locus of control, stability and controllability are dimensions of attributions. Locus of control can be internal or external. The example of an internal locus of control can be feelings, while an example of external locus of control can be the location of the school. Thus, the cause of an incident can be external or internal to the learner. Stability is about the span of the attribution and whether it is permanent or temporary. A skill or talent can have more stability, while showing an outstanding performance in certain tasks can have less stability. Finally, controllability refers to the factors that a learner has control over or the ones that s/he has to obey. The content of an exam can be a factor that the learner may not be able to control, while developing regular study habits can be a factor that s/he has control over. Research shows that all these factors concurrently affect the attributions of students, and teaching learners to give favorable reactions to attributions is possible by teaching them coping strategies such as help seeking.

Another element of motivation is goal orientations which depicts how learners set goals considering their capabilities and skills. As stated by Dweck and Leggett (1988), students determine their goals in accordance with their beliefs of intelligence. Learners who believe that intelligence is a fixed concept focus on performance goals. On the other hand, students who believe that intelligence can be shaped and enriched set learning goals. Students who focus on learning goals are likely to achieve better as they appraise effort over success and show perseverance to learn. However, learners who focus on performance are more likely to go through feelings of helplessness and desperation (Ames & Archer, 1988).

Las but not least, intrinsic motivation is an important contributing factor to motivation. It can be described as looking for success for internal reasons like enjoyment rather than external benefits like rewards (Deci & Ryan, 2000).

All in all, self-regulated learning is a relative new phenomenon in research and researchers take different approaches to it, considering different theories of learning and developing a range of definitions of it. Deriving from such different theories of learning as well as interpretations of the processes of self-regulated learning, various models of self-regulation have been developed. To examine self-regulation from different perspectives, it is significant to review these models. It is also imperative to note that some of these models have overlapping processes.

2.1.1. Major Models of Self-Regulated Learning

There have been several models of self-regulation developed recently as studies focusing on self-regulation as a key factor of success have grown in number. While sharing some common features, these models handle, the self-regulation concept from different perspectives. To illustrate, Craver and Scheir (2005) associate self-regulation with a feedback loop. This feedback loop commences with a goal, standard or reference value. The reference value is used to assess the performance and unless reference value is surpassed, the performance is not seen as successful. The discrepancy between the reference value and the performance provides the necessary feedback. Shah and Kruglanski (2005) take a different approach, defining self-regulation as connections between a network of goals and means which form complex cognitive associations together. These studies illustrate the heterogeneity of definitions of self-regulation from which different models have been developed. In this part of the present study, major models of self-regulation have been reported so as to analyze self-regulation process from different points of view. Five of these models can be named as the Zimmerman model, Boekaerts model, Borkowski model, Pintrich model and Winne model. While the models are introduced, the theories behind the models, their components, and their approach to self-regulated learning are also given so as to provide a better picture of them.

2.1.1.1. Boekaerts' Model of Self-Regulation

Boekaerts (1992, 1995, 1996a, 1996b) offered a model of self-regulated learning which considers SRL not as a unitary construct, but as a system concept merging activity in various control systems. From this perspective, exploring the processes which enable learners to turn a potential learning opportunity into a situation in which the learner identifies as such are essential (Boekaerts & Niemivirta, 2000). In this situation, opportunity and felt need concur. Boekaerts (1996a) mentions learning episode in which such a situation occurs and learners regulate their behaviors. From this perspective, every learning opportunity is different from each other and they take place in certain content as well as a wider social context. For this reason, both contextual factors and how students perceive the task are likely to impact how students regulate their behaviors.

This model takes appraisal into its center. Boekaerts (1992) describes appraisals as continuous evaluation processes which lead to various feelings as well as action readiness of future and present tasks. Students constantly label learning situations as benign, neutral and threatening. As stated before, the Model of Adaptable learning developed by Boekaerts (1992, 1996a) gives a central role to appraisals and it also deals with concepts such as learning, motivation, anxiety, handling with stress and action control. This model of adaptable learning can be named as a holistic one as it covers interwoven aspects of self-regulation. In the structural model of Boekaerts, self –regulation has been divided into six components, namely (1) domain-specific knowledge and skills, (2) cognitive strategies, (3) cognitive self-regulatory strategies, (4) motivational beliefs and theory of mind, (5) motivation strategies, and (6) motivational self-regulatory strategies (Boekaerts, 1996b). In this framework, perception of the learning context, domain-specific metacognitive knowledge and the self-system are three types of information which impact appraisals. From the perspective of Boekaerts and Niemivierta (2000), learners have two major priorities during self-regulation process. The first group of priorities is called the top-down self-regulation in which learners regulate their behaviors so as to extend their personal resources. They look for ways to enhance their social and cognitive skills. The second group of priorities is bottom up self-regulation in which learners protect their already

existing resources and aim to avoid loss, harm or any kind of distortions of well-being. This might include the attempt to look ‘smart’ and protect ego. They also indicated that students struggle to find a balance these two priorities, staying on the ball to attain growth goals and wellbeing goals. Thus, it can be concluded that emotions are essential in Boekaerts’ model. When students need to cope with negative feelings, they are likely to take the well-being route and use bottom–up strategies. That is, perceived difficulty or stress drives students to concentrate on their well-being. Boekaerts (1999a) also stated that pleasing appraisals which lead to the sense of relevance, interest, or higher efficacy are likely to guide students to a path in which they will achieve the mastery of goals. Boekaerts model of classroom self-regulation distinguishes between these two processes for the goal-directed action and emphasizes the role of emotions in the process which she has studied, in detail (see Boekaerts, 2011).

Last but not least, even though some other models also put emphasis on how expectations and goal setting processes of student are affected by contextual and situational variables, the Model of Adaptable learning can be distinguished owing through its certain characteristics. First, it divides personal characteristics into two groups which are individuals’ metacognition and how it relates with the content of the task, as well as the individual’s self and motivational beliefs. This enables us to see the difference between two interpretation processes and recognize motivational control and metacognitive control. Second, the model deals with students’ appraisal of different learning situations in a detailed way and thus it helps us to understand the unique ways that students direct their behaviors such as goal setting, goal striving including mastery mode and well-being mode. Next, empirical studies conducted with the help of this model have shown that both positive and negative task judgments collectively affect student’s intention to learn (Boekaerts, 1999; Boekaerts, Seegers & Vermeer, 1995). To elaborate, the extent to which a learner is attracted to a task is influenced by value-laden perception of the learner, perception of challenge in the task completion and level of success expectancy at the same time, which activates both positive and negative scenarios. Finally, it is important to point out that, in the original model of adaptable learning, the difference between two major processes namely

mastery mode and coping mode was clear-cut while the reasons for why students choose to follow different actions were not specified. In the extended version of the model, conceptualizations of identification and interpretation have been included which reveals the goal setting and goal striving processes.

2.1.1.2. Zimmerman's Model of Self-Regulation

According to Zimmerman (2000), "perhaps our most important quality as humans is our capability to self-regulate" (p.13). Self-regulation enables us to survive and enhance our adaptive capacity under changing circumstances in which other species were bound to disappear. Zimmerman (2000) underscores that our regulatory skills or their absence assume an essential role in our sense of self. For this reason, exploring how to develop this competence, how it functions and its subcomponents, is a vital part of social cognitive theory. Within the perspective of this theory, self-regulation is dealt within the interaction of personal, behavioral and environmental triadic processes (Bandura, 1986). As stated before, this is seen as a cyclical process as information gathered from the previous performance is used to make adjustments. Thus, the feedback loop of one's personal self-regulation is kept open.

In addition to the nature of self-regulation, Zimmerman (2005) also presents the structure of this process. In this structure, there are 1) forethought, (2) performance or volitional control and (3) self-reflection processes and they are also in a cyclical relationship. Table 2 gives a summary of these processes:

Table 2

Cyclical self-regulatory phases of Zimmerman's model

Cyclical self-regulatory phases		
Forethought	Performance/volitional Control	Self-Reflection
Task Analysis Goal Setting Strategic Planning	Self-control Self-instruction Imagery Attention focusing Task strategies	Self-judgment Self-evaluation Causal attribution
Self-Motivation Beliefs Self-efficacy Outcome expectations Intrinsic Interest Goal Orientation	Self-observation Self-recording Self-experimentation	Self-reaction Self-satisfaction Adaptive-defensive

Source. Zimmerman, B.J. (2005). Attaining self-regulation: A social cognitive perspective. In M.Boekaerts, P. R. Pintrich, & M. Zeidner (Eds.), *Handbook of self-regulation,* (pp.13-39). London: Elsevier Academic Press.

Zimmerman (2005) indicates that forethought can be described as influential processes which come before the attempts to act and these processes set the stage for the following actions. The subcategories of this phrase seem distinct, but they are also linked with each other. The first category, task analysis, subsumes two categories, namely goal setting and strategic planning. While setting goals, learners aim for specific learning outcomes such as mastering a language. Highly self-regulated learners manage to have a hierarchical organization of their goals in which proximal and more distant goals have been specified. Once the goal is set, learners strategically plan their methods to perform skill in an optimal way. As no self-regulation strategy works optimally for every learner, they modify their strategies depending on the feedback they receive. However, these processes are unlikely to endure long is a learner is unable to motivate herself/himself to maintain them. As stated before self-efficacy beliefs play a key role in this process. As stated by Bandura (1991), self-regulatory efficacy enables people to set higher goals and stick to them longer. Thus,

goal setting and self-motivation processes feed each other. What is more, with time learner obtain intrinsic motivation out of these processes as they start to see achievement of their goals as a part of a mastery process rather than a desiring for a kind of prize. This process of goal orientation is called a kind of learning by Dweck (1988), a type of mastery by Ames (1992), and a task goal orientation by Nicholls (1984). It has been revealed to maintain the motivation of learners more effectively than an outcome goal orientation process (Pintrich & Schunk, 1996).

As seen in Table 2, the second stage of self-regulation in the Zimmerman model is Performance/volitional Control. Self-control and self-observation are two major processes of this stage. Self-instruction, imagery, attention focusing and task strategies as subcomponents of self-control help the learner concentrate on the task and show optimal efforts to achieve it. In these processes, learners instruct themselves to proceed, create a mental representation of the goal, exclude other distractions to focus on the task and break the tasks into units which are meaningful for the learner. In self-observation stage, the learner marks certain aspects of their performance, including other details such as the conditions under which the performance was displayed and the outcome that it brought. However, the fidelity of this observation is the key variable here as this observation may not be so effective when conducted in complex tasks. However, self-recording can enhance the accuracy and quality of this information and is more likely to bring effective feedback and so enable the learner to take corrective action.

When it comes to the self-reflection phase, there are two major processes suggested by Bandura (1986). These processes are self-judgement and self-reaction. During the self-judgement process, a learner evaluates their task performance and attributes causal importance to the outcome of their performance. While a learner is judging their performance, s/he uses certain criteria or standards. As stated by Zimmerman and Paulsen (1995), the more carefully a learner judges their performance, the higher quality of actions s/he takes for the next action. Learners frequently utilize the following criteria to judge their performances: mastery, previous performance, normative and collaborative. While mastery criteria refers to the use of certain test scores, previous performance can be described as the use of preceding performances

to compare with present performances. Normative criteria refer to use of other people's scores for comparison and collaborative criteria involves fulfilling a particular role usually in a group. At this point, it is important to state that there is a close link between self-evaluative judgements, causal attributions and the forethought process, although they seem like distinct stages. To elaborate, forethought processes influences causal attributions because a learner who plans to benefit from a specific strategy is more likely to attribute failure to that strategy rather than their lack of capacity or inability. However, a learner may attribute their failure to lack of ability rather than insufficient effort which can be a result of personal efficacy or environmental conditions (Bandura, 1991). Furthermore, Zimmerman (2005) states that self-evaluative and attributional self-judgements are connected with self-satisfaction and adaptive inferences which are subcomponents of self-reactions. Self-satisfaction can depend on various factors such as reaching pleasant results, reaching adopted goals or intrinsic motivation, but it is appropriate to underline that a person's satisfaction is not always sourced from the act of reaching the goal. It is also a result of self-evaluative reactions given to behavioral outcomes. Similarly, learners make adaptive or defensive inferences to reach conclusions about how to modify their acts of self-regulation. According to Zimmerman and Martinez-Pons (1992), adaptive inferences are favorable because they guide people to improve their self-regulation strategies such as looking for more efficient strategies or organizing their goals. On the other hand, defensive inferences might hinder self-regulation process as their main premise is to avoid future displeasing outcomes. These inferences are named as self-handicapping by Garcia and Pintrich (1994) as they prohibit progress. They can take the forms of procrastination, helplessness or disengagement (Zimmerman, 2005).

In conclusion, the Zimmerman (2005) model of self-regulation is based on the Social Cognitive theory of Bandura (1986) and regards self-regulation as context dependent. It describes four developmental stages of self-regulation, namely observation, emulation, self-control and self-evaluation. The self-regulation process is described as having three main stages which are forethought performance/volitional control and self-reflection. The model takes both motivation and strategy into its center and provides a detailed framework to understand self-regulation process.

2.1.1.3. Winne and Hadwin Model of Self-Regulation

Winne and Hadwin (1998) bring two new perspectives to self-regulation stating that self-regulation could also be an aptitude as well as an event. Aptitude is described as a relatively stable series of actions performed by the learner, while event is described as a snapshot of longer series of events. They define that measurement of self-regulation as an aptitude so as to predict if the student is likely to perform a self-regulated cognition. When self-regulated learning is handled as an event, it takes place in occurrence, contingency and patterned contingency levels (Winne & Perry, 2000).

Winne and Hadwin (1998) Model of Self-Regulation contains four basic stages. However, before analyzing the stages, it is important to clarify the processes which pervade each stage. Conditions, operations, products, evaluations and standards form the general structure of every stage of the model. Conditions refer to circumstances under which a task is supposed to be completed. Time constraints, available resources and social context can be examples of tasks conditions, while cognitive conditions might include interest, goal orientation and task knowledge. Operations can be described as cognitive processes, tactics and strategies students benefit from while they are completing a task. Products might be defined as pieces of information generated during the conditional transformation process. Each stage might bring out a distinct product which can be internal -referring to the inference drawn from an attribution - and external, referring to the inferences made from observable behavior or performance. Moreover, evaluations denote the internal or external feedback related to the products. Last but not least, standards are the criteria through which the products are checked (Butler & Winne, 1995; Winne & Perry, 2000; Minna Puustinen & Lea Pulkkinen, 2001).

In the first stage of the model, students develop a perception of the related task, so it is the task definition stage. In the second stage, students set goals and make plans on how to attain them. The third stage is particularly important as students enact their tactics in this stage. Tactics consist of conditional knowledge and cognitive operations. These are in the form of ‘ifs’ and ‘thens’ which denote the propriety of the tactic and conditions to change and create information. Cognitive and behavioral outcomes of

these tactics can lead to internal and external feedback. Then in the fourth stage, students gain more metacognitive awareness and consider the things they have constructed in the previous stages (Winne, 1996). In the stage, students may make essential adaptations though monitoring themselves by gradually changing the conditions or the operations, by modifying cognitive structures and by altering the components that form the tactic (Winne, 1997; Rumelhart & Norman, 1978).

Although the model seems linear in nature, it is, in fact, recursive. Feedback that is provided in a stage can be utilized in the same stage provided that metacognitive monitoring detects a difference between the present state of cognition and a goal. Also, the outcome of the monitoring in a previous stage may impact another stage in accordance with the judgment that is obtained. To illustrate, once a tactic effectively works in the stage 3, this might lead a learner to revisit their initial perception of the task that s/he has created in stage 1. Thus, it is appropriate to conclude that stages feed each other in the model.

2.1.1.4. Pintrich's General Framework for SRL

In his model of self-regulated learning, Pintrich (2005) included components of socio-cognitive theory as well as cognitive information processing (Zimmerman & Schunk, 2001). He summarized his model in a table format (Table 3) rather than demonstrating the process with a figurative representation illustrates this model:

Table 3

Phases and Areas for Self-Regulated Learning of Pintrich (2005) Model

	Areas for regulation			
Phases	Cognition	Motivation/affect	Behavior	Context
Forethought, planning, and activation	Target goal setting Prior content knowledge activation Metacognitive knowledge activation	Goal orientation adoption Efficacy judgments Ease of learning judgments (EOLs), perception of task difficulty Task value activation Interest activation	[Time and effort planning] [Planning for self-observation of behavior]	[Perception of task] [Perception of context]

Areas for regulation				
Phases	Cognition	Motivation/affect	Behavior	Context
Monitoring	Metacognitive awareness and monitoring of cognition (FOKs, JOLs)	Awareness and monitoring of motivation and affect	Awareness and monitoring of effort, time use, need for help Self-observation of behavior	Monitoring changing task and context conditions
Control	Selection and adaptation of cognitive strategies for learning thinking	Selection and adaptation of strategies for managing motivation and affect	Increase, decrease effort Persist, give up Help-seeking behavior	Change or renegotiate task
Reaction and reflection	Cognitive judgments Attribution	Affective reactions Attributions	Choice behavior	Evaluation of task Evaluation of context

Source. Pintrich, P. R. (2005). The role of goal orientation in self-regulated learning. In M. Boekaerts, P. R. Pintrich, M. Zeidner (Eds.), *Handbook of self-regulation* (pp. 451-502). San Diego: Academic Press

Pintrich (2005) states that self-regulatory activities serve as a mediator between learners, their environments, and their overall achievement. This model consists of four stages which are forethought, monitoring, control and reflection phases. In every stage, self-regulatory acts have been displayed in four distinct categories as cognitive, motivational and affective, behavioral and contextual. Similar to the Zimmerman (2005) model, the forethought stage consists of prior content knowledge, metacognitive knowledge activation (cognitive area), efficacy judgements and adoption of a goal orientation (motivation and affect area), time and effort planning (behavior area) and perceptions of task and context (context area). Furthermore, the monitoring stage includes awareness and monitoring of cognition (cognitive area), motivation, affect (motivation and affect area), time use, need for help and self-observation of behavior (behavior area) and context conditions (context area). Control activities cover selection and adaptation of strategies for managing learning as well as managing motivation and affect. They also include effort adjustment, persistence, giving up and help seeking. Finally, this phase also contains task change and task negotiation behavior. Pintrich (2005) also adds that even though the model seems hierarchical or linear, it is not necessarily like that. Certain stages might take place simultaneously and they do not have to follow each other.

In addition, Pintrich (2005) underscores the significance of motivational variables and goal orientations in his model. To elaborate, according to Pintrich (2005) what makes a learner more self-regulated is the level of motivation, and if a learner sets their goal as mastering the task rather than performing well to be better than the others, s/he is likely to be better at cognitive monitoring and to utilize learning strategies.

2.1.1.5. Discussion of Reviewed Self-Regulated Learning Models

When all the models reviewed above are taken into consideration, it is reasonable to indicate that models share many similar aspects, but they prioritize different processes of self-regulation. To start with, Boekaerts (1995), Pintrich (2005), and Zimmerman (2005) propose similar definitions of self-regulation as they emphasize goal-orientation in this process. On the other hand, Winne and Hadwin (1998), put emphasis on information processing as they consider learners to be intrinsically motivated and goal-oriented. Furthermore, although all the models involve meta-cognitive monitoring processes or feedback processes, they place these processes in different stages of self-regulation. To elaborate, while meta-cognitive monitoring as well as internal feedback may place in each phase of the SRL process, in other models, it takes place in performance and appraisal phases. This is most probably the result of the underlying theories of these models. Zimmerman's and Pintrich's models derive from Bandura's (1986) social cognitive theory which emphasizes social foundations of thinking and behavior. However, Boekaerts seem to have the impact of Kuhl's (1985) Action Control Theory and by Lazarus and Folkman's (1984) Transactional Stress Theory. Last but not least, Winne and Hadwin (1998) is the most eclectic one as the impacts of the work of Bandura (1986) and Zimmerman(1989), Carver and Scheier (1990), Kuhl and Goschke (1994) and Paris and Byrnes (1989) can be seen in it (Puustinen & Lea Pulkkinen, 2001).

In addition, in all the models summarized above, learners are active in their goal setting and self-regulating process. Although the terms the theorists use differ, in all the models learners go through an initial stage of planning and task analysis as well as adjustment adaptation and performance phases. They actively modify their goals and acts to reach the adjusted task completion stage. Finally, all the models are cyclical

and underline that some stages might take place simultaneously, and there is a feedback loop between the phases thanks to which the learner adapts their self-regulation process.

2.1.1.6. The Models Benefited in this Study

As mentioned above, a few models and frameworks have explained the structure and functioning of SRL (Bandura, 1986; Boekaerts & Niemivirta, 2005; Pintrich, 2005; Winne, 2001; Zimmerman, 1998). The theoretical framework utilized in this study can be described as eclectic. To elaborate, the Pintrich model (2005) and Zimmerman (2005) models are used in the data collection process since the scales used in the study have certain aspects of socio-cognitive theory and information processing theory. The interview questions have been prepared considering many theories of self-regulation as well as the Pintrich Model (2005), so this study has several components of the Pintrich model (2005). Also, the Zimmerman (2005) and Pintrich (2005) models are alike in terms of their theoretical backgrounds and they both contain forethought, performance, and self-reflection phases. Questions related to these phases are addressed to both teachers and students during semi-structured interviews, so Zimmerman model (2005) has been benefited as well. In addition, school related factors of self-regulation are dealt with in this study which is closely linked with the context of learning as mentioned in Bandura's reciprocal interactions in his social cognitive theory as well as the triadic processes of self-regulation put forward by Zimmerman. Thus, the theoretical framework of this study has aspects of the Zimmerman Model (2005). What is more, student related factors of self-regulation have been explored in the present study. As stated in the Winne and Hadwin (1998) model, self-regulation can be an aptitude and this aptitude can be conducive to explain self-regulated behavior as well as mastery of tasks. Thus, the Winne and Hadwin (1998) model is included in the theoretical framework of this study as an incremental factor to explain the self-regulation concept. Last but not least, as stated earlier, the Boekaerts' Model of Self-Regulation states that learners use bottom-up and the top-down strategies of self-regulation to either enhance their personal sources or to preserve already existing ones. This has been helpful in explaining the interview results of the students. Thus, it can be concluded that all four models mentioned earlier

have been used in this study so as to create an eclectic theoretical model and design the study and interpret the results.

2.2. The Present literature on Self-regulated Learning

Self-regulation as a key component in learning process has been the topic of several studies. The present study mainly focuses on the factors which affect the self-regulation processes of students as well as the self-regulation strategies employed by students studying at the top-ranking science high schools of Türkiye. The purpose of this chapter is to provide a review of the literature that is most pertinent to the current study. The chapter includes four sections. The first section involves research studies investigating the relationship between SRL and success. The second section is devoted to student related factors affecting the development of self-regulation skills. The third chapter involves studies pertinent to school related factors affecting self-regulation process of students. The fourth section includes intervention studies to explore the process of self-regulation. The last section presents the summary of the literature review.

2.2.1. Self-Regulation and Academic Achievement

One of the early studies referring to the relationship between self-regulation and academic success was offered by Feldmann, Martinez-Pons and Shaham (1995). The study indicates that the correlation between scores on self-regulation and collaborative learning behavior signals the critical role of self-regulation on grades, and it is possible to state that self-regulation either prompts the occurrence of isolated forms of certain behavior such as collaborative verbal activity or determines the extent to which students can make use of them when they come into play. What they put forward is consistent with social cognitive theory (Bandura, 1982; Zimmerman, et al., 1992), which proposes that self-regulation and self-efficacy are driving forces in success at academic skills and compatible with other studies highlighting the effect of self-regulation on academic success (Azevedo & Cromley, 2004; Blakey & Spencer, 1990; Boud, 1995, 2000; Carolina, Lucia & Rossana, 2014; Collins, 1982; Cooper & Sandi-Urena, 2009; Corno, 1986; Corno & Mandinach, 1983; Ekhlas & Shangarffam, 2013; Garner & Alexander, 1989; Glenn, 2010; Hattie, 2009; Heikkilä & Lonka, 2006; Kim

& Seo, 2013; Kitsantas & Zimmerman, 2009; Kosnin, 2007; Kluwe, 1982; Lopez et al., 1998; Lovett, 2008; Magno & Lajom 2008; Masui & de Corte, 2005; McDonald & Boud, 2003; McGuire, 2008; Ottenhoff, 2011; Pintrich & DeGroot, 1990; Pintrich, 2002; Pressley & Ghatala, 1990; Rock, 2005; Rolf, Scharff, & Hodge, 2012; Schneider, 1985; Schraw & Dennison, 1994; Zimmerman, 2002; Zimmerman et al., 2011). There are other studies with similar implications signaling the positive effect of self-regulatory strategies on the amount and depth of student thinking (Jensen, 2011), students' deliberate efforts to concentrate on their learning (Ottenhoff, 2011), and the making progress in the area of reflective and responsible professionalism (Sluijsmans et al., 1999).

Self-regulation strategies have also been found effective in literacy skills such as reading and writing. As stated by Zimmerman and Bandura (1994), cognitive and motivational variables, two of which can be named self-efficacy and self-regulation, play significant roles in performing these skills at designated levels. Glaser and Brunstein (2007) justify this notion by reporting that self-regulation procedures enhanced the effectiveness of the writing strategies training designed to improve 4th graders' composition skills. The students who received self-regulation training as well as the composition training wrote qualitatively better stories than the comparison group, and they also showed higher performance at a transfer task demanding students to remember essential components of an orally presented story. Erdogan (2008) signaled the same type of relationship between language learning strategies and self-regulation strategies. He also noted that both the employment of self-regulation strategies and language learning strategies increase as the grade level of students increase. Gorgoz and Tican (2020) share a similar result with this study presenting a significantly positive correlation between the use of self-regulation strategies and vocabulary learning strategies while learning a foreign language.

Schunk and Zimmerman (2007) suggest that modeling is an efficient way of fostering self-regulatory and academic skills. That's why they recommend teaching students self-regulation strategies along with the content and modeling the ways to apply them in class are recommended by them. This idea is also supported by Boekaerts (1996c), who emphasizes that the main goal of formal schooling should be helping students to

acquire self-regulation skills which are likely to pave the way for life-long learning. However, she also adds that self-regulation is closely linked with certain types of prior information such as domain-specific knowledge and skills, cognitive strategies to be used in such domains, and metacognitive as well as metamotivational knowledge and skills. Thus, it can be concluded that such knowledge and the use of aforementioned skills collectively shapes academic success (Alexander & Judy, 1988; Weinstein & Mayer, 1986; Winne, 1995).

Another study displaying the key role of self-regulation in academic success was conducted by Agustiani et al. (2016), which revealed a high correlation between self-regulation and academic success among students of Psychology. Similarly, Cazan (2012) reported a positive effect of self-regulation strategies on academic adjustment. The results of the hierarchal regression technique utilized in the study showed that self-regulation is strongly associated with academic adjustment. Anxiety has been noted as a significant factor negatively affecting self-regulation and self-efficacy which causes academic adjustment to decline. What is more, within the existing the literature, there is a great amount of research indicating that students' acts to employ SRL strategies have a significant role in predicting the success of students in computer based learning environments. Because SRL enables students to make judgements about their learning process and create goals and sub goals, it has an important impact on the accomplishment of tasks in computer based learning environments. (Azevedo, 2005; Greene et al. 2010; Greene et al., 2012; Lajoie & Azevedo, 2006).

Duckworth and Carlson (2013) bring a different perspective to the impact of self-regulation on school success and state that self-regulation contributes to teacher-assigned grades more than standardized achievement tests. Dispositional self-regulation and overlapping personality trait of conscientiousness (Caspi & Shiner, 2006), lead to more hours spent on homework and studying and less time for TV (Duckworth & Seligman, 2005), well-behaved manners in classroom (Duckworth et al., 2012). These are more related to teacher assigned tasks than standardized achievement tests. Still as a capacity to restrict external distractions and to make more room for behaviors oriented towards superior goals, self-regulation should be cultivated Duckworth and Carlson (2013).

Yumusak et al. (2007) add a new understanding to the relationship between self-regulation and success. They emphasize that although it was clear that students employing high levels of organization strategy use such as outlining and time and study environment management obtained higher achievement, rehearsal strategy use was found to negatively interact with achievement. This result was not in line with research findings in the USA which signals a positive correlation between the use of rehearsal strategy and academic achievement. Yumusak et al. (2007) offer an explanation by stating that this might be because of the nature of the questions and the extent of the processing strategies they required. If the question is mainly about recalling a certain piece of information, it is more likely to collocate with rehearsal strategy use such as outlining or summarizing. For this reason, they suggest that before putting forward the relationship between a self-regulation strategy and achievement, success as a construct should be clearly defined. Some of the self-regulatory skills might only predict a test measuring higher order skills rather than simply reciting certain facts. This idea was also supported by Kuyper et al. (2000), who underlined the importance of operationalizing the self-regulation variable and how the achievement is tested in order to explain the contradictory results that can be found in the literature.

Instruction focusing on strategy use is a potent way of enhancing self-regulation (Corno & Mandinach, 1983; Schunk, 1986). Training of learning strategies such as concept mapping also direct students' efforts to tasks, possible ways to learn the content better, organizing the material and their own schedule, as well as creating a fruitful psychological climate for learning which fosters self-regulation process and so facilitates the learning process (Chularut & DeBacker, 2004; Weinstein & Mayer, 1986). For this reason, as suggested by Lan (1996) all students including students with disabilities to graduate students and undergraduates need to gain self-regulation strategies. This is only fair because lack of self-regulation skills leads to low achievement, which can be particularly obvious at college level as students are expected to guide their own studies at this level. This notion has also been supported by Balkis and Duru (2015), who underline that lack of self-regulation skills can be regarded as an indicator of underregulation which is likely to lead to procrastination and result in a negative effect on the affective well-being of students. For this reason,

to enhance academic achievement, it is imperative to teach self-regulation strategies at all levels of education as well as college education particularly to students in teacher education, department who are supposed to be self-regulated to raise self-regulated students (Vrieling et al., 2018; Orange, 1999).

2.2.2. Definition of Self-regulated Learning as a General Concept versus a Domain Specific Concept

While SRL has gained more and more significance as a factor affecting success as well as many other fields of living, a need to analyze this process emerged. In an attempt to define borders of the definition of this phenomenon, Dinsmore, Alexander and Loughlin (2008) conducted a review of the literature. They state that in the early studies of self-regulation, which were shaped by Albert Bandura's (1986) Social Foundations of Thought and Action, behavioral and emotional regulation were discussed and the concept was dealt with from a general perspective. While Bandura's work keeps its prominence, self-regulation in academic contexts that is self-regulated learning has emerged in research. The definition of self-regulated learning has been touched upon by s both endogenous and exogenous theories of learning and has mostly been seen as a reflection of dialectical constructivism. However, while the definition of the self-regulated learning process has reached a comprehensive understanding, integrating a range of theories, what happens during the SRL process has been approached from different perspectives.

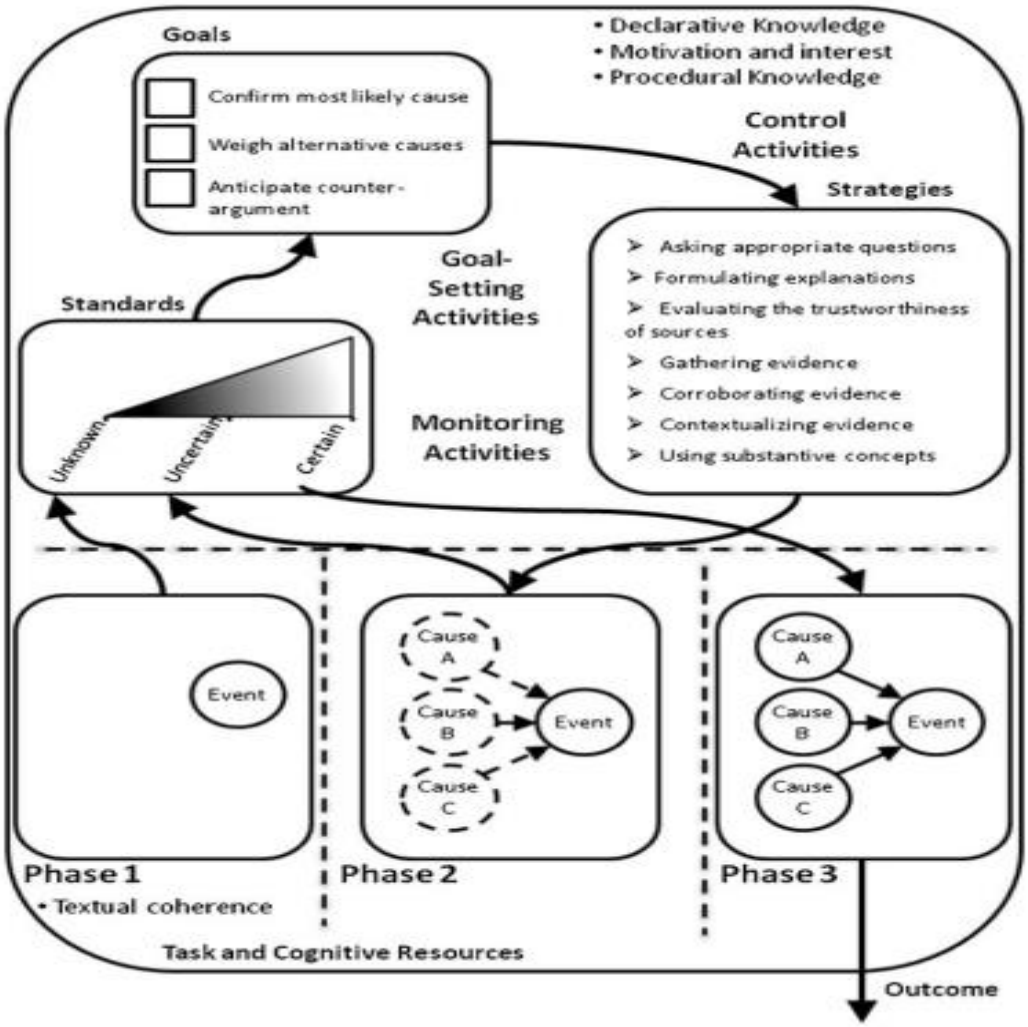
To elaborate, there are numerous studies handling SRL as a general concept and depicts the processes of SRL accordingly without making any distinctions across the subjects. However, there is also research indicating that SRL is domain specific and the SRL process varies from one subject to another. To illustrate, while Zimmerman and Schunk (2001) published on the place of self-regulation in academic contexts, researchers such as Harris, Ready and Graham (1991) elaborated on this the topic by dealing it in more specific academic contexts such as writing. Furthermore, major models of self-regulation such as the Zimmerman model, Winnie Model or Pintrich Model takes a general approach to SRL and reports the process of SRL from a bigger perspective. On the other hand, several researchers (e.g. Alexander, 1995; Greene et

al., 2013; Poitras & Lajoie, 2013) have argued that SRL strategies carry obvious signs of being domain-specific. For example, Alexander (1995) underlines how domain specific processes of self-regulation interact and lead to different processes of regulation in various contexts of learning.

Poitras and Lajoie (2013) offer an understanding of this issue by combining empirical SRL studies and theoretical models together to reach an understanding of the process of students' developing an understanding of historical events as well as how and why they started. While doing that they avoided reporting declarative knowledge of how such an understanding is created. They signified that in order to achieve the demanding task of learning, academically flourishing students have gone through an intricate coordination of strategies which are domain specific. They handled the issue from the perspective of history classes. Students have used self-questioning techniques, corroborated subjects or identified system related or individual factors triggering certain events in history. Such strategies have been applied by students so as to reach an understanding of complex historical phenomena. They offer a model called the three-phase model of Cognitive and Metacognitive activities in learning through Historical Inquiry (CMHI). An illustration of this model can be seen in Figure 4.

Figure 4

Constructs, processes, and phases of SRL in the CMHI model



Note. The figure illustrates the three-phase model of Cognitive and Metacognitive activities in learning through Historical Inquiry (CMHI). Adapted from "A domain-specific account of self-regulated learning: the cognitive and metacognitive activities involved in learning through historical inquiry" by Poitras, E. G., & Lajoie, S. P. 2013, *Metacognition and Learning*, *8*(3). p.218. Copyright 2013 by Springer Science+Business Media New York

The model given in Figure 4 illustrates a domain specific perspective to SRL in which learners repeatedly adapt themselves to cognitive and metacognitive processes in order

to develop an understanding of historical events. The model puts special emphasis on monitoring, goal setting and control phases of self-regulated learning in the case of history. It is defined as a domain specific model of self-regulated learning because it elaborates on the stages the learner goes through while learning historical events, linking the events with each other and developing insights of causality between events. It also touches upon certain problems that a learner might face while learning history and some strategies that learners employ while tackling these problems. Specifying some gaps in the knowledge, and failing to reveal the chains of causality are some of these problems, and monitoring one's performance and checking and reaching available sources are some stages of the process that learners go through to reach a goal. The significance of inquiry is emphasized in the model. This is also in line with what Carretero and Lee (2014) and Wineburg (2001) stated. These studies indicate the domain specific nature of self-regulated learning. On the other hand, Rotgans and Schmidt (2009) signals no significant difference in the employment of SRL strategies in the fields of English, History and Math.

While SRL has gained more and more significance as a factor affecting success as well as many other fields of living, a need to analyze this process emerged. In an attempt to define borders of the definition of this phenomenon, Dinsmore, Alexander and Loughlin (2008) conducted a review of the literature. They state that in the early studies of self-regulation, which were shaped by Albert Bandura's (1986) Social Foundations of Thought and Action, behavioral and emotional regulation were discussed and the concept was dealt with from a general perspective. While Bandura's work keeps its prominence, self-regulation in academic contexts that is self-regulated learning has emerged in research. The definition of self-regulated learning has been touched upon by s both endogenous and exogenous theories of learning and has mostly been seen as a reflection of dialectical constructivism. However, while the definition of the self-regulated learning process has reached a comprehensive understanding, integrating a range of theories, what happens during the SRL process has been approached from different perspectives.

To elaborate, there are numerous studies handling SRL as a general concept and depicts the processes of SRL accordingly without making any distinctions across the

subjects. However, there is also research indicating that SRL is domain specific and the SRL process varies from one subject to another. To illustrate, while Zimmerman and Schunk (2001) published on the place of self-regulation in academic contexts, researchers such as Harris, Ready and Graham (1991) elaborated on this the topic by dealing it in more specific academic contexts such as writing. Furthermore, major models of self-regulation such as the Zimmerman model, Winnie Model or Pintrich Model takes a general approach to SRL and reports the process of SRL from a bigger perspective. On the other hand, several researchers (e.g. Alexander, 1995; Greene et al., 2013; Poitras & Lajoie, 2013) have argued that SRL strategies carry obvious signs of being domain-specific. For example, Alexander (1995) underlines how domain specific processes of self-regulation interact and lead to different processes of regulation in various contexts of learning.

This incongruence in research related to the self-regulation's domain specificity leads us to examine other research in the literature on this issue. Endedijk, Vermunt, Meijer and Brekelmans (2014) assert that physics and history tasks share the same metacognitive activities in 60% of the time. This means that 60% of the metacognitive activities applied to both physics and history tasks in their taxonomy. The differences are sourced from the use of these metacognitive skills in different domains. To illustrate, learners questioned themselves and organized their insights as a planning activity in both domains. However, while they were trying to infer meanings from complicated history texts in the history tasks, they were dealing with graph axes or coordinate systems in Physics task. This leads us to the implication that self-regulated learning can include both general as well as domain specific components.

Pressley's Good Information Processor Model developed by Pressley, Borkwski and Schneider (1989) set forth similar implications as well. The model which puts emphasis on the use of cognitive strategies effectively. The model advocates five main premises. These are the employment of a range of tactics, possession of metacognitive information related to when, how and why to utilize these tactics, extensive task related information, staying away from interferences and developing habits to apply the aforementioned strategies naturally. When we focus on the first premise of Pressley, Borkwski and Schneider (1989), it is possible to see that they put emphasis on the use

of cognitive strategies. Within these cognitive strategies they make a distinction of higher and lower cognitive strategies. They state that higher order strategies are general strategies of self-regulation and they do not depend on the domain. These higher order strategies help the learner to manage lower order strategies. To illustrate, as a higher order strategy a learner ranks the tasks at hand in accordance with importance and makes a plan accordingly. Lower level strategies are, on the other hand, domain specific and controlled by higher order strategies. Solving a complex Math problem step by step can be an example of a domain specific strategy. The researchers conclude that use of higher order strategies to manage the lower ones are imperative to self-regulate.

In conclusion, despite the fact that early writing on self-regulation acknowledged self-regulation as a general concept across domains, later studies have reported domain specific elements of self-regulated learning process. However, recent studies show that these two notions are not mutually exclusive and the self-regulated learning process is convoluted encompassing both general and domain specific properties.

2.2.3. Student Related Factors Affecting Self-Regulation

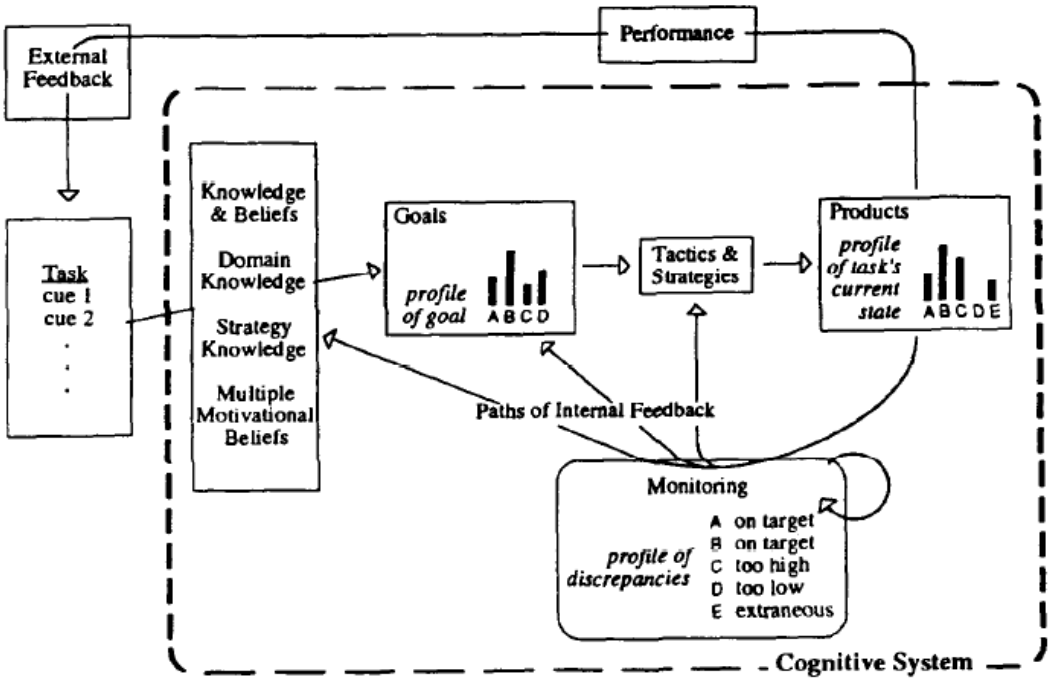
One of the most basic questions to ask while examining the self-regulation process is "Why Do Some Students Self-regulate the Learning Process and Others Do Not?" For this reason, students' capacity to control their behavior in relation to the goals they set has been the topic of plenty of research in an effort to explain individual factors affecting this process (Boekaerts & Cascallar, 2006). Making effective choices, creating a hierarchy of goals and maintaining consistency are some contributing factors of self-regulation process (Sheldon & Elliot, 1998). This leads us to focus on reasons to self-regulate for students. These reasons could be in the form of multiple goals which can be academic as well as social. For example, students might want to be competent in various the topics, develop their negotiating skills, write or speak fluently in another language. They might also like to feel belonging to a group, empower themselves and the other or protect their well-being including bringing joy to their lives, protecting their pride or sharing excitement as well as anger (Boekaerts et al., 2006 as cited in Boekaerts & Cascallar, 2006). Thus, it is possible to conclude

that students' choice of goals is the key individual factor in SRL. Although there is much research signaling the conscious act of setting goals, there are also studies underlining the impact of the non-conscious process of decision making. Bargh and Chatrand (1999) underscore that many goals that students set are actually pre-consciously activated. Learners often act intuitively when they are faced with a new situation and they make decisions in milliseconds considering their past goals and goal-directed behaviors in accordance with a range of self-aspects (Bargh & Gollwitzer, 1994 & Kuhl, 2000).

Individual factors of self-regulation have also been explored by Winne (1996) from a metacognitive approach. So as to scrutinize these factors, firstly it is essential to examine the demonstration of self-regulation process as illustrated by Winne (1996).

Figure 5

The Summary of Self-Regulation Process Offered by Winne (1996)



Note. Adapted from "A metacognitive view of individual differences in self-regulated learning" by Winne, P. H. 1996, Learning and individual differences, 8(4), p. 3. Copyright 1996 by JAI Press Inc.

As stated by Winne (1996), there are many areas in this process which are under the influence of individual factors. Particularly, he suggests five areas of individual differences which are likely to influence metacognitive monitoring and control in SRL. These areas can be named as domain knowledge, knowledge of tactics and strategies, performance of tactics and strategies, regulation of tactics and strategies and global dispositions. To elaborate, the degree of expertise affects the self-regulation process because once the learner has the expertise in the area, s/he feels less need for search and s/he is likely to have well-tuned strategies to apply without feeling overwhelmed by the complexity of the task. Similarly, when the students have tactics and strategies in the IF-THEN and IF-THEN-ELSE forms, it means that they have developed certain scenarios that fit into certain environments. It is also important to note that these strategies and tactics can be complex and multifaceted for learners with well-developed self-regulation skills. They might include epistemological beliefs, expectations of efficacy and beliefs related to motivation. Once these tactics and strategies are performed, learners identify the errors in them. By practicing them further and improving them depending on the obtained feedback, the relationship between IFs and THENs are reinforced and these strategies and tactics become automatic for learners. During this process, individual factors impacting decision making process are likely to impact the self-regulation process too. Complexity, speed and reliability are potential factors that learners consider while choosing among the tactics and their choice is affected by individual factors. Last but not least, global dispositions have been stated as effective individual factors for self-regulation skills. As shown in Figure 5, dispositions can be a factor in epistemological (Schommer, 1994 as cited in Winne, 1996) and motivational beliefs (Schmeck 1988 as cited in Winne, 1996). While learners are setting goals to attain, they shape this process with these beliefs and they furnish the process with tactics and strategies. These dispositions can be counted as individual differences shaping the style of approaching the tasks for learners.

The available the literature involves the other individual factors such as information literacy, attitudes towards IT, and self-regulative knowledge affecting self-regulation process (e.g. Jukes et al., 2000). Furthermore, a positive attitude towards IT and

information literacy have been mentioned as enhancing factors of self-regulative learning. Students who are information literate with a positive attitude towards information technologies have a greater capacity to self-learn and regulate the learning process by employing various technologies to reach needed information (Yen et al., 2005).

In addition to the complex process of goal setting, self-regulation has been found quite related with emotional regulation in the literature. Malmivuori (2006) suggest affect as an individual factor influencing the use of self-regulatory strategies. She underlines that connections among affective responses, self-appraisal and self-regulation at the meta-level has been potent in Mathematics learning and problem solving. Research also shows that some environmental cues lead students to emotional arousal which is difficult to regulate by some learners. How students interpret the environment is an individual factor affecting their goal setting and so self-regulation while how the arrangement of the learning environment triggers feelings is a school-related factor. This leads us to consider student related factors as well as the school related ones while analyzing this process (Boekaerts & Cascallar, 2006).

2.2.4. Instruction-related Factors Affecting Self-Regulation

School as a learning and socialization environment has been noted as influential in the self-regulation process of learners (e.g. Boekaerts & Cascallar, 2006). In this regard, first of all it is important to note that learners who do not feel a sense of belonging to their environment are more likely to have regulating their learning process and get poorer results (Wentzel, 1991). Nevertheless, there are classroom practices stated in the literature which have a positive impact on the development of SRL strategies. As suggested by Magno (2009) certain classroom activities which facilitates the active participation of learners can actually foster the self-regulation process. Rozendaal, Minnaert and Boekaerts (2005) offered the following strategies to be employed by teachers to facilitate the self-regulation processes of students at schools: (1) prepare group assignments at home and write them on the blackboard as soon as you enter the classroom; (2) activate relevant prior knowledge; (3) prepare the students for group assignments by providing prior knowledge; (4) invite students to work in interactive

learning groups; (5) coach student behavior during collaborative learning; (6) give feedback on what is learned at the end of a lesson (p.144-145).

For this reason, school related factors are pivotal in developing self-regulation strategies. Contextual clues as suggested in the principles of social constructivism have the potential to direct student behavior and help them generate multiple content goals (Boekaerts & Cascallar, 2006). Zimmerman (1989) underlines that students' interactions with teachers are the most essential experiences which guide self-regulated learning. This idea is also supported by Butler and Winne (1995) who emphasize that teachers can make learners more self-regulated by providing them feedback and teaching them learning strategies. In addition, as mentioned by Boekaerts et al. (2006), teacher enthusiasm, humor, clarification and appropriate pacing provided by the teacher as well as autonomy that is granted to learners can be triggering factors for self-regulation. Besides, higher expectations set by teachers have been found effective as a school related factor in self-regulation. On the other hand, this effect can be positive as well as negative. Students create mental representations of pleasant and unpleasant cues in a learning environment. Such cues direct learners' attention to learning tasks or they may deter them from these tasks by arousing negative feelings like boredom or hopelessness. That's why teacher expectations as a school related factor are likely to have a different effect depending on the individual traits of students.

As stated by Orange (1999), using peer models to teach self-regulation is effective, so peers who set good examples in terms of use of self-regulation strategies might be a factor that is positively affecting this process. This role of interaction between peers to enhance self-regulation has been also acknowledged by Boekaerts and Cascallar (2006).

IT-integration has been raised another school related factor affecting self-regulation process of learners. Lewis and Mendelsohn (1993) underline that school that have a higher level of IT integration provide more opportunities for self-learning which are likely to create more self-regulated learners. This notion is also supported by Yen et al. (2005) who concluded that IT-integration is an important predictor of self-regulation in Malaysian Smart schools.

Finally, it is significant to note that the relationship between school related factors and use of self-regulation strategies is reciprocal rather than one way. To elaborate, certain school related factors have been raised as effective in enhancing the use of such strategies, but the perception of students on school environment and its characteristics have also been influential in students' use of self-regulatory strategies. Putting emphasis on mastery goals rather than performance goals has the potential to enrich school identification as well as participation and to motivate students to use more self-regulatory strategies (Wang & Holcombe, 2010).

2.2.5. Empirical Research on Self-Regulation

Self-regulation (or self-regulated learning) is ''an active, constructive process whereby learners set goals for their learning and then attempt to monitor, regulate, and control their cognition, motivation, and behavior, guided and constrained by their goals and the contextual features in the environment'' (Pintrich, 2000, p. 453). As seen in this definition, setting objectives and creating strategies to achieve them are a large part of self-regulation. That's why there is a great emphasis on self-regulation research in learning contexts in recent the literature (Schunk, 2005). Another justification for this emphasis comes from Zimmerman (2001), who underlines that today it has been revealed that skills and abilities alone do not suffice to explain success and other contributing factors such as self-regulation and motivation are considered crucial. As self-regulation is a broad concept, different processes that form self-regulation have been dealt with in research so as to have a deeper understanding of it and its link with success. Research on the self-regulation and learning sphere has focused on key processes of self-regulation, motivation and observable regulative behaviors, contextual and cognitive factors as well as the comparison between poorly self-regulated and well self-regulated learners. To this end, a considerable amount of research has explored the impacts of interventions designed to better students' self-regulatory skills and academic success. During such intervention, it has been a common practice to teach to set goals, benefit from effective tactics, observe their own progress, keep the record of their learning, organize their studying, create an effective environment to study as well as many other skills (Schunk & Ertmer, 2000). As stated

by Steffens (2006), these interventions can be performed with modeling or without modeling, both espousing the attempts of self-regulation of learning process.

Perels et al. (2005) present an intervention study to report the impact of a training including self-regulation and problem-solving components. The study specifically aims to enrich students' self-regulation and problem-solving competence in mathematical word problems. As an unexpected result, the study denotes the significant effect of the self-regulation training on the problem-solving measure, which is a view also supported Fuchs et al. (2003). The research was conducted at German grammar schools (Gymnasium) in which students have higher competencies just like the science high schools in Türkiye. For this reason, the sample is special and more research might be a requirement to generalize the results. However, it is still justifiable to state that self-regulatory competence and problem-solving behavior can be augmented by the training of self-regulatory processes. Similarly, Rozendaal et al. (2003) present a study which is designed to reinforce students' cognitive and motivational self-regulation with the help of an intervention of the interactive involving learning group system (ILS). The study takes students in Dutch secondary vocational colleges as its sample. Just like Perels et al. (2005), this study affirms that the level of self-regulatory behavior can be increased through even a short training. Moreover, as expressed by Pintrich (2000), many earlier studies signal the relation between cognitive and motivational self-regulation. However, this study is significant for many reasons, two of which can be counted as more important than the others. First, the study helps us generalize the effects of self-regulation training across the contexts. Second, it assists in exploring self-regulation through one more domain: information processing. In the same way, Bautista (2012) converges mastery learning approach with self-regulation strategies for Biology training purpose and underlines that Bandura and Zimmerman's Self-Regulated Learning strategy predicts the extent to which student-learners acquire and benefit from corrective learning feedback to enrich their performance in a range of contexts. Hofer, Yu and Pintrich (1998) apply an intervention method to students by providing a module of learning strategies course. As a result of this intervention, a decrease in the test anxiety of students has been observed as well as an increase in their self-efficacy beliefs.

Azevedo and Cromley (2004) administered a self-regulation intervention so as to explore the effectiveness of self-regulated learning (SRL) training in fostering college students' learning with hypermedia. The training had many components such as planning (planning, sub goals, prior knowledge activation), monitoring (feeling of knowing, judgment of learning, self-questioning, content evaluation, identifying the adequacy of information), strategies (selecting new informational source, summarization, rereading, and knowledge elaboration), task difficulty and demands (time and effort planning, task difficulty, and control of context), and interest. The results of the study demonstrated that teaching self-regulatory strategies helped students make a shift in their mental models significantly more than did the control condition. Similarly, another study exemplifying the effects of self-regulation training intervention has been exemplified by dela Fuente Arias, Justicia, and Garcia Berben (2006) (as cited in Magno, 2009). Utilizing the "presage-process-product" model of Biggs (2001), they integrated self-regulated teaching and learning into various processes of teaching such as interactive teaching systems and evaluation systems. The findings of the study indicated an improvement in self-regulated learning measured through a scale.

Perels et al. (2009) put forward another intervention study with a different approach. The study offers an intervention of self-regulation training as an integrated part of the math classes of 6th graders. Unlike other trainings of this subject, Perels at al. (2009) do not just include certain components of self-regulation (for an overview, see Schunk & Ertmer, 2000). The intervention done in this study contains all the aspects and stages of the self-regulation process. The results of the study denote that enhancing mathematical performance can be achieved by training self-regulatory strategies during regular classes. For this reason, Perels at al. (2009) underline that teaching interdisciplinary self-regulatory and domain-specific strategies can be useful if they are integrated in regular elementary school lessons to facilitate the development of auspicious learning behavior as early as possible. Table 4 provides a summary of some empirical studies focusing on self-regulated learning:

Table 4

Some Empirical Studies on Self-Regulation

Author(s)	Focus of the Study	Results of the Study
Rozendaal, Minnaert, and Boekaerts (2003)	- an intervention of the interactive learning group system (ILS) designed to reinforce students' cognitive and motivational self-regulation in Dutch secondary vocational colleges	-the level of self-regulatory behavior can be increased through even a short training. -it signals the relation between cognitive and motivational self-regulation.
Azevedo and Cromley (2004)	-an intervention including the use of specific, empirically based self-regulation variables designed to foster conceptual understanding	-the SRL condition facilitated the shift in learners' mental models significantly more than did the control condition -verbal protocol data indicated that this was associated with the use of the SRL variables taught during training.
Yen, Bakar, Roslan, Luan, and Rahman (2005)	-a study designed to uncover the predictors of self-regulated learning in Malaysian smart schools	-multiple regression analysis showed that levels of IT-integration, student-teacher interactions, motivational beliefs, and self-regulative knowledge significantly predict self-regulated learning
Perels, Gürtler, Schmitz (2005)	-an intervention designed to enhance German gymnasium students' mathematical problem solving and self-regulation skills	-the intervention was effective to improve mathematical problem solving and self-regulation competence. -the combination of self-regulatory and problem-solving strategies leads to the better effects for the improvement of self-regulatory competences.
Perels, Dignath, Schmitz (2009)	-an intervention designed to analyze and compare the impact of different self-regulation components on student self-regulated learning and their learning results in their mathematical achievement	-it is possible to support self-regulation competencies and mathematical achievement by a self-regulation intervention within regular mathematics lessons of 6th-grade students.
Bautista (2012)	-a study designed to investigate the convergence of Bloom's Mastery Learning Approach (MLA) and Bandura's Social Cognitive Theory in Zimmerman's Self-Regulated Learning (SRL) Strategy in increasing students' academic performance in Biology	-the students who were exposed to the converging teaching modalities developed better performance in Biology -significant interaction of the models to the experimental grouping and mental abilities of the respondents are concluded in the study
Becker (2013)	-an intervention designed to help students acquire self-regulation skills while learning the course content based on Zimmerman's model of the academic learning cycle.	-self-regulated learning skills have been shown to have a positive impact on achievement in the academic setting, enabling graduates to become lifelong learners in professional settings.
Jivet, Scheffel, Schmitz, Robbers, Specht and Drachsler (2020)	- an empirical study on learner goals, self-regulated learning and sense-making of learning analytics in higher education.	-the higher the overall SRL score, the more relevant the three factors were perceived by learners. -the higher the overall SRL score, the more relevant the three factors were perceived by learners.

As stated by Schunk (2005), such intervention studies are highly valuable as they have the potential to tell us what to do when students are at risk for failure, providing us with the tips to preserve motivation and self-regulation. However, as stated by Rosenshine, Meister, and Chapman (1996) interventions to train students for learning skills are only productive to the extent that they foster students' metacognitive awareness of self-regulation strategies which fit into specific learning contexts. The effectiveness of such interventions rely on teachers' efforts to assist learners in making newly learned self-regulation strategies automatic (Winne, 1995). To this end, Paris and Paris (2001) offer 12 principles which can be benefited by teachers in creating in-class activities that foster self-regulation. They highlighted that students can be trained to use self-regulation strategies effectively through explicit instruction, guided reflection, metacognitive group discussions, and participation in practices with experts. This process can also be inspired via by modeling and activities which require reflective analyses of learning.

2.3. Summary of Review of the Literature

By reviewing the available research, it is possible to state that studies on self-regulation deal with the effect of self-regulation on academic achievement and development of various skills as well as the factors affecting the enhancement of self-regulation strategies. While early research focuses on the process of self-regulation and how it works, recent research is more engaged in various circumstances that trigger the development of this process. Furthermore, there have been a range of intervention studies investigating the impact of certain types of trainings on the augmentation of the employment of self-regulation strategies.

In addition, in order to investigate the concept of self-regulation from various aspects, it is also important to note the studies which explore exploring its relationship with online and blended learning. Studies on self-regulation have focused on the effect of self-regulatory strategies on online and blended learning particularly after the outbreak of the COVID-19 pandemic which has led the world to consider alternative ways of education apart from the face-to-face. Both early research referring to the era before

the pandemic and recent research on the effect of self-regulation on the success in online learning and blended learning is diverse. Lynch and Dembo (2004) reported that self-regulatory learning variables chosen for the study which are intrinsic goal orientation, Internet self-efficacy, help seeking, and time and study environment management were not significant predictors of performance in blended learning courses under investigation. However, this finding might be a result of the homogenous group of highly self-regulated students. Nevertheless, Broadbent (2017) underlined that students taking online courses students used SRL strategies more often than students learning through blended education with the exception of peer learning and help seeking. Similarly, when comparing traditional education with the online one in terms of self-regulation, Broadbent and Poon (2015) found that four major learning strategies could be linked with the online learner's success: metacognition, time management, effort regulation, and critical thinking. On the other hand, Broadbent and Poon (2015) provided the conclusion that even though use of SRL strategies seem to be generalized in the online learning environment, the effectiveness of use of such strategies can be weakened in the online learning environment. Therefore, it might not be wise to think that online learning actually facilitates the self-regulation process. As a final note, it has been stated in the literature that comparing self-regulatory strategies and the process of using of these strategies by different learners receiving traditional, online and blended education might not be a suitable approach. As underlined by Bernard et al. (2014), learners are attracted to these kinds of different learning styles because of their already existing self-regulatory strategies. Students who prefer traditional education might prefer to be in a social learning context to regulate their learning, which might also be true for students who take part in blended courses and receive face to face as well as the online education. On the other hand, learners engaged in online learning activities are attracted to this medium of education as they already possess self-regulation strategies and enjoy learning in an autonomous and flexible environment. Thus, learning strategies among these groups may differ not only because of the type of training they are exposed to but also because of the learner profiles. However, last but not least, it is essential to underscore that although these conclusions are germane and valid, they might not fit into the pandemic environment where online education has been a must rather than a choice.

Finally, it is essential to mention the discussion on whether self-regulation is a domain-specific or general disposition. Research on the process of self-regulation is diverse in the literature in terms of its being domain specific concept or general trait. Boekaerts and Corno (2005) reviewed the literature on this specific issue and concluded that early research regarded self-regulation as a general concept which enabled students to address their learning needs. However, recent the literature suggests that self-regulation involves measures which change depending on the context. This has also led to some changes in how self-regulation is measured. Rather than the decontextualised measures of SRL, now domain-specific measures of self-regulatory skills have been employed by researchers. Since 1990s, research has shifted its focus on expertise in certain disciplines which are enriched by self-regulation skills. Boekaerts and Corno (2005) also state that these two approaches are not incompatible with each other and they both shed light on different aspects of self-regulation process.

CHAPTER 3

METHOD

This chapter initially provides a description of the overall design of the study, which is followed by the research questions, context of the study, sample, data collection instruments, data collection procedures, data analysis and validity issues. At the end of the chapter the limitations to the study is shared.

3.1. Overall Design of the Study

Research paradigms are 'the entire constellation of beliefs, values, techniques, and so on shared by members of a given community' (Kuhn, 1970, p.175). As also put forward by Klenke (2016), every paradigm brings about its own assumption related to the nature of reality or ontology, how knowledge is constructed, or epistemology, which eventually determines the selection of method, participants, data collection, and analysis and interpretation as well as the influence of research. In the area of educational research, there are there basic research paradigms. These are positivism, constructivism or interpretivism, and pragmatism. While the positivist paradigm suggests that knowledge is universal and can be understood, identified, and measured, the constructivist paradigm states that people create their own understanding and knowledge of the world by experiencing things and reflecting on those experiences. However, pragmatism focuses on what works best rather than taking one method of looking for the truth as the sole method. It does not rely on either-or view and embraces both paradigms. For this reason, pragmatism takes a flexible approach to research following post positivism and constructivism and allows researchers to mix the methods to reach multiple realities. As stated by Strauss and Corbin (1988), any technology, referring to the method, is just a means to reach a goal which is theorizing.

Therefore, the main issue is not the instrument itself but how and when these modes can be handy for the process of theorizing (McKeganney, 1995).

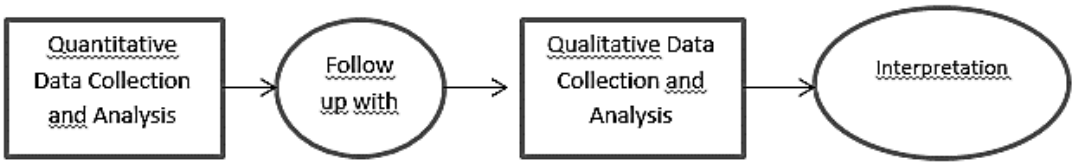
Thus, this research paradigm presents a mixed-method approach to research. A mixed-method approach suggests that research can benefit from both qualitative and quantitative research methods (Creswell, 2011).

Patton (1990) states the design of research mainly depends on the purpose of the research. This study has a mixed method design collecting both qualitative and quantitative data so as to answer the research questions comprehensively. The mixed method has been recently favored in research as it enables researchers to obtain a greater insight into research issues than either qualitative or quantitative approaches alone. According to Creswell and Plano Clark (2011), mixed method design refers to the procedure of collecting, analyzing, and thus "mixing" qualitative and quantitative methods in a single study or in a series of studies so as to address a research problem. The combination of both forms is expected to provide a fuller understanding of research questions. According to Creswell (2014), mixed-method research design is not simply about collecting two blocks of data. It involves merging, integrating, or embedding two types of data. As stated by Miles and Huberman (1994), with the help of mixed methods, researchers can obtain a very powerful mix. The logic behind this method is that quantitative data and results draw a general picture of the research problem. However, through qualitative data, the researcher can refine, extend or explain the general picture. To elaborate, this research type is strong because quantitative data enable the researcher to work with statistically analyzed numbers, providing an opportunity to analyze the frequency and statistically significant trends of large samples. Furthermore, qualitative data provides the actual words of people giving the researcher numerous perspectives on the issue so as to unfold the complexities of the study. Whereas quantitative data provide the numbers, qualitative data provide "stories" of these figures. Teddlie and Tashakkari (2009) underline that mixed-method research leads to better inferences and minimizes method-related bias. As the subcategory of mixed method research design, the present study utilizes the explanatory sequential mixed method design (also called a two-phase model; Creswell

& Plano Clark, 2011). Figure 6 displays the steps of the explanatory sequential design of mixed method design:

Figure 6

The Explanatory Sequential Design of Mixed Method Design



Note: Adapted from *Educational research: Planning, conducting, and evaluating quantitative and qualitative research* (4th ed.) by Creswell, J. W. 2014. Upper Saddle River, NJ: Pearson Education. Copyright 2014 by Pearson.

As seen in Figure 6 in this type of design, a researcher initially collects and makes an analysis of the quantitative or numeric data. Then qualitative or text-based data are collected and analyzed. This second stage of data collection and analysis assists the researcher in explaining or elaborating on the quantitative results gathered in the first stage. Thus, qualitative data is built on quantitative data. These two types of data are connected and are used to answer the questions of the study. The rationale for this approach is that the quantitative data grants statistical results, and qualitative data refine and explain those statistical results by exploring participants' views in more depth, as well as bringing about more data to answer the research questions of the study.

In the present study, the first quantitative data were collected from both teachers and students, which provided a general picture of the answers to the research questions. In the case of this study, the quantitative data helped the researcher answer the first two research questions, which investigated various self-regulation strategies employed by the students and the beliefs of teachers regarding self-regulated learning. Furthermore, the questionnaire administered to the students enabled the researcher to choose the students who applied the highest number of self-regulation strategies to have

interviews with them in the second stage of the study. Thus, the researcher was able to detect highly self-regulated students and started to explore the student related and instructional factors that facilitated their self-regulation process. As Merriam (2014) stated, the sample of the qualitative data should be determined in a way that should be directly in line with the research questions of the study and the problems that the research attempted to address. Similarly, Creswell (2013) adds that participants of such studies should be the ones who have personally experienced the phenomena under scrutiny, and so are able to share anecdotes related to the topic. That's why having interviews with teachers was crucial and these interviews helped the researcher elaborate on each research question. Thus, thanks to the quantitative data collected through the Self-regulatory Strategies Scale (SRSS), the researcher could both collect data related to the first two research questions and also detect the fitting student participants for the qualitative data collection, that is, interviews. To elaborate, qualitative data were collected from teachers and students, which assisted in explaining the quantitative results and expanding the data of the study by building more bricks into the wall. In order words, this process provided more data to answer the research questions. As the questionnaire administered to the students included the strategies used by high school students in the forethought and performance phases only, the self-regulated learning strategies utilized in the self-reflection phase were investigated through the student interviews. In this step, the researcher elaborated on the quantitative data. The researcher made use of qualitative data to refine the results from the quantitative data, which involved probing key results of the self-regulation process in detail and collecting data for the third and fourth researcher questions as well as the sub-question of the first research question. As stated by Boekaerts and Cascallar (2006), "a combination of different assessment tools allows researchers and teachers to capture what students think, feel, and undertake in order to steer and direct their learning and motivation in a domain" (p. 207).

All in all, the study had a mixed design in order to obtain a more comprehensive picture of the research topic. The data collection process started with the collection of quantitate data gathered from both teachers and students. Then collection of qualitative data followed this process, which enabled the researcher to build onto the quantitative

data by elaborating on the results and to collect data for the other research questions. Finally, both types of data were brought together and interpreted. The results were discussed by mixing the results of the data analysis. It started with quantitative data both to collect data for the first and second research questions which investigated the self-regulation skills of students as well as the beliefs of teachers related to self-regulated learning and to determine the students to be interviewed. The study continued with qualitative data collection in order to explain the results of the quantitative data collection and collect data for the third and fourth research questions, which investigated student related and instruction related factors facilitating students' development of self-regulation strategies respectively. Additionally, qualitative data obtained from students helped the researcher answer the sub-question of the first research question, which explored whether self-regulation strategies of students differed from one course to another or it is a general concept that stayed the same through different academic fields.

3.2. Research Questions

The present study sought to answer the following research questions:

1. What are the SRL strategies of students studying at the top ranking state high schools of Türkiye?
    - Does the use of self-regulation strategies of students vary depending on the course?
2. What are the beliefs of teachers working at the top ranking science high schools of Türkiye regarding self-regulated learning?
3. What are the instruction-related factors promoting the SRL strategies of students studying at the top ranking state high schools of Türkiye?
4. What are the student related factors promoting the SRL strategies of students studying at the top ranking state high schools of Türkiye?

3.3. The Context of the Study

The data of the present study were collected from the top five science high schools in Türkiye. The first science high school in Türkiye was established in 1964 in Ankara.

Today, there are 310 science high schools in Türkiye (OGM MEB, 2023). In very basic terms, the aim of science high schools is to raise future scientists and well-educated people in the area of science. The Ministry of Education in Türkiye reports the rationale behind the establishment of science highs schools as the following:

> Science High schools aim at; preparing students with a high level of intelligence and ability in math and sciences for the related academic faculties, being resources for the allocation and training of qualified personnel and scholars needed in related scientific and math areas, directing and stimulating the students to do researches, creating suitable environments for those who are interested in conducting researches or inventing new things via scientific and technological tools or means, educating those who are capable of and enthusiastic about using new technologies, producing new knowledge and preparing projects accordingly, training them in foreign languages to equip them with necessary skills to be able to make scientific researches, to follow up with the new scientific and technological advances. (p.3, MEB, 1999).

These schools provide more classes in Math and Science than regular high schools (called Anatolian High schools) in Türkiye. In addition to education, which is mostly focused on natural sciences and Math, these schools aim to teach English to their students. Students are accepted to these high schools with the exam scores taken from the high school entrance exam. This exam is administered throughout the country, and students can study in any science high school they wish as long as they have the required score. All the science high schools are boarding high schools, so students can go to other cities to study (MEB, 2010). These high schools are highly valued in Türkiye as students accepted to these schools are considered academically very successful. Also, these high schools are seen as a door opening to the top universities in Türkiye as graduates of science high schools are usually accepted to the top universities of Türkiye, particularly in the areas of science and medicine (Pesen, Oral, & Epçaçan, 2020).

There have been a few studies on the science high schools of Türkiye. These studies mostly focus on attitudes or perceptions of science high school students towards certain variables such as Math learning or technology integration (Akboy,1998; Barut, Odacı, 2002; Batur & Adıgüzel, 2015; Birol, 2005; Cigerci, 2006; Karaduman, 1997; Mutlu, 2006; Pehlivan & Köseoğlu, 2011; Pesen, Oral & Epçaçan, 2020). There are other studies focusing on curriculum and instruction in Science schools (Selvi, 1996;

Yılmaz & Morgil, 1992; Yürümezoğlu, 2008). However, there are no studies focusing the on the self-regulation skills of students studying in science high schools, so there is a niche in the research related to this topic.

3.4. Sample

The data were collected from students studying at the top-ranking high schools of Türkiye and their teachers.

3.4.1. Sampling in the Quantitative Phase

For the quantitative data, the cluster sampling method was used. Cluster sampling is a method including two stages in which the entire population is separated into clusters or groups when the target population is very large or spread out, and studying each subject would be costly, time-consuming, and improbable. In this case, it is better for the researcher to divide the group into smaller units and to choose among these groups. In addition to being time and cost-efficient, this method helps the researcher provide a high rate of external validity, as the characteristics of the sample are maintained, and the population is represented (Jackson, 2011; Ray, 1983). In the present study, different aspects of self-regulated learning were investigated in the top-ranking science high schools in Türkiye. Considering the population of the study, ten top-ranking high schools in Türkiye were determined. Among these, five of them were randomly chosen so as to administer the questionnaire.

As mentioned before, the population of the study is the top-ranking high schools in Türkiye, so five science high schools in Türkiye have been determined via the cluster sampling method. These are Ankara Science High School, İzmir Science High School, İstanbul Atatürk Science High School, Çapa Science High School, and Adana Science High School. Once the clusters were determined, the sample was obtained, administering the questionnaire to all 9th and 10th-grade classes. These grades were preferred so as to minimize the effect of university entrance exam preparation on the research. Also, students in these grades are taking a range of common core classes before they select their department of the natural sciences in science high schools. For

this reason, administering the questionnaire in 9th and 10th grade helped the researcher reach a better description of self-regulation strategies employed in different classes.

The student sample for quantitative data included 857 students from five different science high schools in Türkiye. The majority of the students (n = 557, 64.99%) were male, while 284 (35.01%) were female. Sixteen of the participants did not indicate their gender. Almost half of the participants were in 10th grade, whereas 275 (32.08%) were in 9th grade.

The teacher sample included 106 teachers working at the five science high schools. They comprised 46 (45.28%) females and 58 (54.72%) males. Their age ranged from 28 to 58 (M = 44), and teaching experience ranged from six to 37 (M = 20). Table 5 displays their distribution by teaching field.

Table 5

Teacher Sample

Branch	***f***
Math	16
Turkish	16
Foreign Language	14
Biology	11
Physics	11
Chemistry	10
History	8
Other (geography, philosophy, etc.)	20

3.4.2. Sampling in the Qualitative Phase

For qualitative data, criterion sampling was used for the student sample, and maximum variation sampling for the teacher data. While choosing the students to be interviewed, three students who got the highest score from the questionnaire were chosen. While choosing the teachers to be interviewed, branch, gender, and years of experience were taken into consideration. Both samples included 15 participants. Table 6 presents the demographic information of the participants who took part in teacher interviews:

Table 6

The Teacher Interviewees

Teacher	Branch	Years of Experience	Gender
Teacher 1	Math	20	M
Teacher 2	Physics	17	M
Teacher 3	Chemistry	15	M
Teacher 4	Biology	22	F
Teacher 5	Turkish	19	M
Teacher 6	History	10	F
Teacher 7	German	14	F
Teacher 8	English	17	F
Teacher 9	Geography	14	M
Teacher 10	Religious Education	23	M
Teacher 11	Philosophy	24	F
Teacher 12	Math	22	M
Teacher 13	Biology	19	M
Teacher 14	Chemistry	16	M
Teacher 15	History	24	M

As seen in Table 6, 15 teachers were interviewed, and 10 of them were male, while 5 of them were female. All the teachers can be described as experienced teachers as all of them have more than ten years of teaching experience. However, their years of teaching experience change from 10 to 24. Once data were collected from teachers teaching core subjects, the researcher kept contacting teachers and inviting them to the interviews. This process continued until the data reached saturation.

When it comes to student participants, it can be stated that students with better self-regulation skills or the ones who employ such skills more often were selected. Marshall and Rossman (2011) indicate that qualitative researchers can only explore the phenomenon of interest in detail if they elect a specific size, and this selection impacts all the subsequent decisions related to the study. For this reason, Marshall and Rossman (2011) suggest that researchers should justify their setting and provide a sound rationale. In this study, science high schools were chosen as the students are selected among high achievers. For this reason, they stand a better chance of being self-regulated. However, in order to see if these students are, in fact, self-regulated and what kinds of self-regulation strategies they use, the SRSS was administered to the

students. Then based on the results of this questionnaire, the students to be interviewed were selected. Table 7 illustrates the demographic information of the students who took part in the interviews:

Table 7

The Student Interviewees

Student	School	Grade	Gender
Student 1	Adana SHS	10th	M
Student 2	Adana SHS	9th	F
Student 3	Adana SHS	10th	M
Student 4	Çapa SHS	9th	F
Student 5	Çapa SHS	10th	M
Student 6	Çapa SHS	10th	F
Student 7	Istanbul Atatürk SHS	9th	M
Student 8	Istanbul Atatürk SHS	9th	M
Student 9	Istanbul Atatürk SHS	10th	M
Student 10	Ankara SHS	9th	F
Student 11	Ankara SHS	9th	F
Student 12	Ankara SHS	10th	F
Student 13	İzmir SHS	10th	M
Student 14	İzmir SHS	10th	M
Student 15	İzmir SHS	9th	M

As seen in Table 7 out of 15 students, nine of them were male, while six of them were female. Eight students were studying in 10th grade, while seven of them were studying in 9th grade.

At this point, it is appropriate to justify the number of teacher and student participants in the study. Finally, students and teachers were interviewed until the point of saturation was reached. Deciding on an appropriate number of participants is vital while collecting qualitative data because having a low number of participants can be a threat to the credibility and the transferability of the research. On the other hand, the information that the participants provide related to the research questions is stated by Patton (1990) to be more relevant to the validity of the research. In the present study, reaching the saturation point has been taken as the key factor in determining the number of participants, as suggested by Marshall and Rossman (2011) and Lincoln and Guba (1985). This principle which is data saturation, can be explained as no new

information being obtained from the researchers (Lincoln and Guba, 1985). With this purpose in mind and considering suggestions of Polkinghorne (1989), who states that 5 to 25 people that own experiences of the phenomenon being studied, and Yıldırım and Şimşek (2011), who state that ten people to be interviewed can be an appropriate number for a phenomenological study, 15 students and 15 teachers were interviewed. Thus, data saturation was obtained.

3.5. Data Collection Instruments

In the present study, four data collection instruments were used. First, two different questionnaires were administered to the teachers and students. Then both teachers and students were interviewed via the interview questions prepared by the researcher. To elaborate, quantitative data were collected from students studying in the 9^{th} and 10^{th} grades at the top ranking high schools of Türkiye using the Self-regulatory Strategies Scale (SRSS) developed by Kadıoğlu et al. (2011). The rationale behind developing this scale was to create a scale with good psychometric characteristics so as to determine the self-regulatory strategies that high school students use while studying. Kadıoğlu et al. (2011) stress that while each self-regulated learning process is equally important and they are interrelated, study strategies are primarily employed by students in forethought and performance phases mentioned by Zimmerman (2000). It is most of the time in the self-reflection stage that students assess their performance and decide on the success or failure of certain factors. Thus, Kadıoğlu et al. (2011) suggest first uncovering the strategies in the forethought and performance process and then exploring the strategies they utilize in the self-reflection process after the performance. Therefore, the strategies in the study were restricted to the forethought and performance phases. While creating the scale, initially a pool of 48 items was created using the interviews with high school students, Zimmerman's self-regulation model, and self-regulation instruments available in the literature. The constructs -namely motivation regulation, effort regulation, planning, attention focusing, summary strategy, highlighting strategy, using additional resources, and self-instruction- were proposed in the study Table 8 shows the constructs proposed in the study and the sample items of that particular construct:

Table 8

Construct Names and Sample Items of the Self-regulatory Strategies Scale (SRSS)

Constructs	Sample Items
Motivation Regulation	I persuade myself to work hard in order to learn the topic.
Planning	I decide on what to learn before I start studying a task.
Effort Regulation	While studying for a task, I give a break if I do not understand the subject.
Attention Focusing	Before starting to study, I organize my study environment.
Task Strategies	I list the concepts that I cannot understand.
Using Additional Resources	I study the topic from different resources.
Self-Instruction	While solving a problem, I explain to myself how to solve the problem

Note. The Constructs were taken from Kadioglu, C., Uzuntiryaki, E., & Çapa Aydin, Y. (2011). Development and Validation of the Self-regulatory Strategies Scale (SRSS). *Eğitim ve Bilim, 36*(160), 11.

As seen in Table 8, the questionnaire contains eight constructs of forethought and performance phases of self-regulation. The questionnaire has 29 items. The results of the confirmatory factor analysis conducted with this questionnaire confirmed eight factor solution. The Cronbach's alpha for each factor varied from .68 to .82. All in all, the findings of the study conducted with this scale offered evidence for the validity and reliability of the SRSS scores. Considering these results, this questionnaire was chosen to be used in the present study. Thus, with the help of this questionnaire, data on students' self-regulatory strategies employed in forethought and performance phases were collected.

Moreover, quantitative data from teachers were collected through the Self-Regulated Learning Teacher Belief Scale (SRLTB) developed by Lombaerts, De Backer, Engels, Van Braak, and Athanasou (2009). The SRLTB is a scale that requires self-reporting of teachers in terms of introducing self-regulated learning, and it has ten items. Lombaerts et al. (2009) found the motivation to develop this scale in the literature, stating that the beliefs of teachers had a substantial impact on their practices. The authors first started by searching the literature concerning attitudes towards SRL, a

variety of teachers' experiences with SRL, possible problems encountered during the process of facilitating SRL-based instruction, and contributions of SRL to students' learning. This scale has a one-factor structure referring to the adherence of teachers to SRL. Rasch analysis conducted by Lombaerts et al. (2009) showed a good fit of the scale to the unidimensional continuum model. Besides, the results indicated that SRLTB has internal consistency (alpha=.79). Thus, the scale was reported to be a useful instrument for exploring teacher beliefs about self-regulated learning practices (Lombaerts et al., 2009).

Because the native language of the teachers in the population of the study is Turkish, the Turkish Adaptation version of the Self-regulated Learning Teacher Belief Scale suggested by Ozan, Ercoskun, and Kincal (2015) was utilized. (See Appendix D for the sample items of the Turkish Adaptation version of SRLTB). The study conducted by Ozan et al. (2015) to adapt the scale into Turkish for language equivalence, reliability, and validity and Exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) showed that the scale has a uni-factor construct, in line with the original construct of the scale. The scale was also confirmed to have high reliability with a .79 internal consistency coefficient. Thus, the Turkish-language equivalence of the scale was proven to be reliable and valid in examining teachers' beliefs about self-regulated learning. On the other hand, the scale was generated and adapted in the context of primary and secondary schools only. The authors did not report any use of this scale within the high school context. Implementation of the scale with different groups of teachers was one of the recommendations given by Ozan et al. (2015) to test the validity and reliability of its use in further studies. Thus, the scale was selected to assess the beliefs of teachers on self-regulated learning in the high school context, and a kind reminder was added to the beginning of the scale, reminding teachers to fill in the scale considering the science high school context. Before conducting the study, this version of the scale was piloted with 51 teachers from three different science high schools. As SRLTB and the Turkish adaptation of SRLTB were used in the primary school context as well as secondary school contexts, respectively, there was a need to check if the scale fitted into the high school context, particularly into the science high school context. For this reason, CFA was conducted. There are several fit indices to

detect the fit adequacy of the tested model in CFA. These are Chi-Square Goodness, Root Mean Square Error of Approximation (RMSEA), Standardized Root Mean Square Residual (SRMR), Normed Fit Index (NFI), Non-Normed Fit Index (NNFI), Comparative Fit Index (CFI), Goodness of Fit Index (GFI), and Adjusted Goodness of Fit Index (AGFI). Values like chi-square value/df value lower than 2; RMSEA value lower than .08, SRMR value lower than .05; NFI, NNFI, CFI, and GFI values greater than .95 indicate good fit (Baumgartner and Hombur 1996; Byrne and Campbell 1999; Gefenand Straub 2000; Hooper et al. 2008; Hu and Bentler 1999). The results of the CFA pointed out that the fit indices had values significantly above acceptable values, which again affirmed the one-factored structure (Chi-square/df=1.77; RMSEA=.061; SRMR=0.036; NFI=1.06; NNFI=0.99; CFI=1.32; GFI=1.31).

In addition, two interview protocols were developed: one to collect data from students and one for teachers. The interview protocol for students included 13 semi-structured questions to explore a deeper understanding of the strategies employed by the students studying at the top-ranking high schools of Türkiye. The questions asked in the interviews were created with the help of two sources. First, the guidelines proposed by Zimmerman and Pons (1986) were used as the theoretical framework. Second, a detailed review of the literature has been conducted and the results of this review have been used to prepare questions. Considering the review of literature, individual variables of student self-regulation reported in research were explored in the interviews. As the aim of the study is to investigate the SRL strategies used by the students studying at the top ranking science high schools of Türkiye and to reveal the factors which facilitated the development of these strategies, the questions were created to investigate the development processes of such strategies as well as their usage. As stated earlier, Zimmerman (2005) model of self-regulation was considered while preparing the interview questions. Zimmerman and Pons (1986) state that the term ‘self-regulated learning strategy’ refers to the actions aimed at obtaining information or skills that involve agency, purpose (goals), and instrumentality as well as self-perceptions owned by a learner and suggested researchers utilize Self-Regulated Learning Interview Schedule (SRLIS) so as to assess the use of self-regulatory strategies. There are other studies verifying the validity of SRLIS to

determine the extent of the use of self-regulation strategies and to evaluate the employment of such strategies by students with high and low performance (González-Torres & Torrano, 2008). Based on the present literature, several categories of self-regulated learning strategies were determined. A free-response interview format was preferred so as not to suggest any specific self-regulation strategies to the students. All the questions were asked in a context such as the following: “teachers often assign their class the task of writing a short paper outside class on a topic such as one's family history. They frequently use one's scores as a major part of one's grade. In such cases, do you have any particular methods to help you plan and write the paper?” Thus, just as Zimmerman and Pons (1986) did, interview questions in the present study were prepared based on the self-regulation processes in the literature, and they were posed in a context.

To elaborate, as a part of forethought process, questions related to goal setting and planning were asked. So as to study performance or volitional control processes, questions related to self-control, self-instruction, imagery, attention focusing, task strategies, self-observation, self-recording, self-experimentation were asked. So as to examine self-reflection process, questions related to self-judgment, self-evaluation, causal attribution and self-reaction of students were posed. Additionally, adaptive strategies of students were checked.

After the questions were prepared, feedback from three experts in the field of education who hold Ph.D. degrees in this field was received. The wording of the questions was revised considering this feedback, and some sub-questions were added. Then the interview questions were piloted with two students who studied in two different high-ranking state high schools of Türkiye. These interviews were transcribed and critically analyzed by the researcher in terms of the flow of the conversation and the data the interview provided. The questions were refined and finalized after these piloting interviews. In addition, as the SRSS (i.e., the questionnaire administered to the students) does not involve self-regulated learning strategies related to the self-reflection phase, particular attention was paid to creating additional questions investigating the strategies employed in this phase. All the questions were designed within a theoretical framework, they all served to answer a particular research question

and they were posed in a context. (See Appendix I for the interview questions for students and their theoretical framework.) To illustrate, question number 6 that is "You have a very important exam in the coming days and you have a lot to cover, but limited time to study. How would you study for this exam? (Since when have you been using this method? How have you learned or developed this method?)" is one of them which aims to explore the SRL strategies of students under difficult circumstances and the possible factors which helped them to develop those strategies. During the interviews both the strategies implemented by the students and possible elements which might have triggered the students' use of such strategies were investigated. The question number 4 that is "What is the most efficient method of studying for you? Why? How have your learned or developed this method? (Do you make arrangements in environment before you study? How? Why? Since when, have you been doing this?)" is an example of this aim. Besides, questions regarding the discussion of self-regulation as domain-specific or not have been formulated. To illustrate, the question number 11 that is "Do the learning strategies you apply differ from one course to another?" aimed to study this issue.

The questions within parentheses which are subquestions were asked depending on the flow of the interview. In some cases, they were asked so as to have students talk about that specific strategy and influential factors impacting the development of that particular strategy. However, in other cases, students started to talk about those subjects after the first question was asked, so it was not necessary, as the student had already provided the answer within the course of the conversation.

Additionally, interviews were conducted with teachers as well so as to explore school related factors affecting self-regulation. Fourteen questions were prepared for the interviews with teachers. Just as the interviews with the students, the questions asked to the teachers were prepared based on the existing the literature and they were posed in a context, too. Once the questions were generated taking the existing the literature into consideration, feedback on these questions from three experts in the field of education who hold Ph.D. degrees in this field was received. Considering this feedback, some changes in how the questions were asked was made in order to avoid directing the participants to certain answers. Then the questions were piloted with two

teachers working at two different high ranking state high schools. These interviews were transcribed also and critically analyzed by the researcher in terms of the flow of the conversation and the data the interview provided. After the piloting interviews, the questions were revised and minor changes were made. Thus, the interview questions were finalized. These questions were used to elaborate on the views of the teachers on self-regulated learning and to obtain data on the instruction-related factors affecting the development of self-regulated learning strategies. To illustrate, question number 3 was asking "Could you please describe your teaching process in general? How do you teach the subjects? What activities do you usually benefit from in classroom?" so that the researcher could investigate the instruction related factors such as group assignments activating relevant prior knowledge, preparing the students for group assignments by providing prior knowledge, inviting students to work in interactive learning groups and coach student behavior during collaborative learning. They were also questions seeking to uncover particular aspects of SRL, such as question number 5 "Do you help your students to set academic goals? How?", question number 6 "How do you motivate your students to learn better?" or question number 7 "How do you help your students with the subject that they have difficulty in learning? Why do you use that methods?" or question number 14 "Do you have your students evaluate their own progress? If so, how?" (See Appendix J for the interview questions for teachers and the purpose they served.)

Thus, extensive data on the self-regulation strategies employed by the top-ranking students in Türkiye, the beliefs of teachers on self-regulated learning, and student related as well as school-related factors impacting the development of these strategies were obtained.

3.6. Data Collection Procedure

After the design process was completed, permission to conduct the study was granted from the METU Human Research Ethics Committee in Ankara in the spring semester of the 2021-2022 academic year. Following the ethical permission to conduct the study, an application to the Ministry of National Education (MONE) was made so as to collect data from five science high schools. As the schools from which the data were

planned to be collected were located in different cities of Türkiye, the application was addressed to the General Directorate of Secondary Education. All the information on the design of the study, consent forms, and data collection instruments of the study were provided to the general directorate of secondary education. Then the general directorate of secondary education granted the permission to conduct the study in the state high schools and informed the directorates of national education in the four cities where these science high schools were located. These cities were Adana, Ankara, İzmir, and İstanbul.

After these processes were completed, the researcher contacted the school principals of all the schools and sent the announcement of the research as well as the consent forms and data collection instruments. Cooperating with the school principals and psychological counselors of the schools, the researcher set a date for each school visit. These dates were determined considering the academic calendar of the schools as well as their program for extracurricular activities. The dates were set by communicating with the school managers and psychological counselors of the schools so as to obtain the highest number of students and teachers during the school visits. To illustrate, if the students were planning to attend a conference on certain days or if teachers were expected to be on leave on certain weeks, those dates were not preferred. Thus, reaching the maximum number of participants was achieved.

When the dates were set for each school, the schools were visited by the researcher. Packs of the SRSS to be administered to the 9^{th} and 10^{th} grade students in the schools were prepared for each class considering their population, and each pack included one copy of the SRLTBS as well. Teachers and students were requested to fill in the questionnaires during the day and submit the pack to the researcher waiting for them in the teacher's room. All the teachers teaching 9^{th} and 10^{th} grades on the data collection day were provided with a pack at the beginning of the school day. In order to administer the questionnaire to the teachers, the researcher stayed in the teacher's room during the data collection day and invited teachers to fill in the questionnaire. In some schools, the teachers were spending time mostly in the specific rooms designed for their branch, such as biology class, physics laboratory, or geography class. Because this information was shared with the researcher by the school manager earlier to ensure

a maximum number of participants, the researcher visited those places at schools and administered the questionnaire.

All the schools were visited by the researcher in person, and all the data were collected by the researcher only. After the quantitative data of the research were collected, interviews were carried out so as to collect qualitative data. In order to determine the students who were going to be interviewed, the questionnaire results were entered into a Microsoft Excel file immediately after the data were collected. While the scores of the students were being entered into the data sheets, the student number of each student was used as the identifier of the student. On the questionnaire, there was a part to be filled by the students which was asking the student number of that particular student. This part enabled the researcher to identify the students who got the highest scores from the questionnaire.

After the students who obtained the highest score from the SRSS administered by the researcher were identified, contact people in each school were informed. These people were either assistant principals of the schools or psychological counselors. These people contacted the students who obtained the highest scores and asked if they would volunteer to take part in the second stage of the study by having an interview with the researcher. Three of the top scorers from each school were invited to have an interview with the researcher through Zoom, an online meeting tool. All the students who were invited to the interview accepted to take part in the study. The conditions of the interview were standardized so as to minimize the threats to internal validity. To elaborate, the interviews were conducted by the researcher only through Zoom after school. The students and teachers were asked to be in a silent place and alone so as to avoid the impact of any external factor. All the participants provided these conditions. The researcher conducted the interview in the same silent place alone, too. After the consent forms were signed, the students and teachers were interviewed via Zoom, an online meeting tool. The interviews took approximately half an hour, and the students provided extensive data on their self-regulation skills and the factors that affected the development of these skills. Afterwards, the interviews were transcribed for data analysis.

For the teacher interviews, selected teachers from each of these subjects were contacted and invited to an interview with the researcher. Teachers from different subjects were interviewed until the data reached saturation. All the interviews were conducted through Zoom, an online meeting tool. The interviews took about 30 minutes. The data collection process started on the 26th of May, 2022, after all the data collection instruments were prepared, and necessary permissions were granted. The process was completed on the 12th of June, 2022.

3.7. Data Analysis

Data sources and data analyses used in the current study are presented in Table 9.

Table 9

Data Sources and Data Analysis

	Research Question	**Data Sources**	**Data Analysis**
RQ1	What are the SRL strategies of students studying at the top ranking state high schools of Türkiye?	Self-Regulatory Strategies Scale (SRSS) and Student Interviews	Descriptive statistics Content analysis
RQ1a	Does the use of self-regulation strategies of students vary depending on the course?	Student Interviews	Content analysis
RQ2	What are the beliefs of teachers working at the top ranking science high schools of Türkiye regarding self-regulated learning?	SRLTB Scale Teacher Interviews	Descriptive statistics Content analysis
RQ3	What are the instruction-related factors promoting the SRL strategies of students studying at the top ranking state high schools of Türkiye?	Student Interviews & Teacher Interviews	Content analysis
RQ4	What are the student-related factors promoting the SRL strategies of students studying at the top ranking state high schools of Türkiye?	Student Interviews & Teacher Interviews	Content analysis

Quantitative data were analyzed using descriptive statistics with the help of IBM SPSS Statistics for Windows (Version 27.0) in order to answer research questions 1 and 2. Qualitative data were examined through content analysis for all of the research questions. The content analysis method, which is used to analyze qualitative data, mainly involves exploring different expressions of people used during the interviews so as to detect certain patterns in the data. By transcribing and organizing the data, the researcher can break a large amount of data into manageable codes and identify patterns in these codes in order to link these small units with larger concepts or a variety of discussions in the related literature (Bogdan& Biklen, 2007; Patton, 1990). Initially, the interviews conducted with teachers and students were transcribed with the help of a computer-based word-processing program. This process started when the majority of interviews were completed, as suggested by Bogdan and Biklen (2007). Once all the interviews were completed and transcribed by the computer processing program, all the audio files were listened to by the researcher, and all the transcriptions were reviewed in order to make sure that the transcriptions were accurate and complete. Furthermore, the researcher wrote short notes next to the transcriptions at certain points so as to capture every nuance of the participants' expressions. Also, a table of demographic information of the participants was created.

Miles and Huberman (1994) state that there are three actions in qualitative data analysis that should be done in tandem. These are data reduction, data display, and making conclusions. Data reduction refers to the process of organizing and categorizing the data. Data display refers to the process of placing bits and pieces of information into tables, charts, matrices, and so on in order to keep a systematic record of the data. In the making conclusions stage, the researcher makes inferences based on the data. These steps are also recommended by Creswell (2013). Thus, it is appropriate to state that qualitative data analysis is an iterative process requiring data reduction, data display, and making conclusions activities to be done several times.

As stated by Patton (1990), during the process of analyzing qualitative data, the researchers take the role of instruments of data analysis. As suggested by Bogdan and

Biklen (2007), the researcher of the present study read the data carefully and went over it several times so as to develop a coding system and so as to divide the data into manageable units. As the researcher had only the descriptive data, categorization was needed to discover the patterns in the data. There are two ways of doing this, as stated in the literature. The researcher determines the categories prior to the analysis. These categories are based on previous knowledge, theory, and experience. Also, the researcher can grow familiar with the descriptive information collected and take notes of the emerging categories as the analysis goes on. In the data analysis procedure of the present study, these methods were combined. To elaborate, the researcher started with a group of categories mentioned in the research but also allowed other categories to emerge during the data collection process. Thus, first, the data were classified into categories. While codes are labels revealing the content of the data in certain headings, a category is a way of classifying the data into certain themes (Miles & Huberman, 1994). For this reason, both are necessary to handle large amounts of data and make meaning of them. As stated before, the first categories of data were created, and so the data were organized. Then certain codes were created for the data under these categories. While creating the categories and codes, the researcher benefited from the existing literature (Creswell, 2013). Therefore, it is possible to state that the process was mostly completed with deductive coding. However, there were times when new concepts, perceptions, and unique experiences were revealed by the participants. At these times, inductive coding (Patton, 1990) or open coding (Maxwell, 2013) techniques were used, and new codes were created. At times, certain units of data allowed the researchers to create more than one category or multiple codes, which contributed to the depth of the discussions that could be made with these data.

In order to ensure the accuracy and comprehensiveness of the categories and codes created by the researcher, the researcher compared the categories and codes with her notes and the audio recordings. Minor changes were made in the codes during this process to ensure that the codes represented the true meaning of the expressions of the participants. MAXQDA 2022 (VERBI Software, 2021) was utilized for the qualitative data analysis.

3.8. Validity Issues

The first issue was that to provide intercoder reliability, the researcher asked another Ph.D. candidate holding an M.A. degree in the field of curriculum and instruction to code the transcriptions of one teacher and one student interview. The researcher did not share any of her codes at this stage to ensure a blind coding process. Then after the second coder completed the process, the researcher compared her codes with the codes the second coder provided and checked consistency. The codes showed a considerable amount of consistency. However, the way the codes related to the activities of teachers to promote SRL were organized showed some minor differences. For this reason, the researcher got together with the second coder and discussed the organization of the codes. Then it was decided that instructional factors mentioned by the teachers could be categorized as in-class activities and extracurricular coaching activities in a clear way. Thus, the codes were organized accordingly. Later, the researcher shared these codes and categories that she created with the transcripts of both teacher and student interviews with three experts in the field of curriculum and instruction. These people have publications on self-regulation and hold Ph.D. Degrees in the field of education. The researcher kindly requested these experts to check the codes and categories and provide feedback on their consistency (Marshall & Rossman, 2011; Miles & Huberman, 1994; Patton, 1990). This enabled the researcher to ensure the consistency of the codes. Additionally, thick descriptions of the findings, codes, and quotes were shared with these experts so as to clarify the coding process. After feedback was received from experts, some codes were revised in terms of wording. For example, "*primary school teacher*" was an instructional factor code created by the researcher. However, this was found vague by the other coders, so it was revised as the *role of the primary school teacher*. Also, "*peers*" was a code under the umbrella of *student related factors,* and it was revised as peer collaboration to make it clear. Other than that, codes were found to be consistent by the experts, and the coding process continued. The codes were constantly checked and revised. Besides, in order to meet referential adequacy, the codes were depicted with quotations, and enough data were provided to interpret and create implications. The researcher also made sure that the codes did not overlap. Additionally, by refining the categories and codes, the researcher made sure

that the rationale behind placing certain codes' falling under particular categories was clear. This process was also identified by Guba (1978) and named internal homogeneity and external heterogeneity. Taking these processes into consideration, both codes and categories were revised until the final version of codes and categories was reached.

Another issue that was addressed in this process was the trustworthiness of the research, which also refers to credibility, transferability, dependability, and confirmability. Meeting all these criteria determines the quality of the research (Lincoln & Guba, 1985; Marshall & Rossman, 2011). In order to meet the credibility criterion of the trustworthiness of the present research, the researcher took certain steps. To elaborate, once the data collection instruments, that is, interview questions, were developed, feedback on these instruments was taken from three experts in the field of education who hold Ph.D. degrees in this field (Yıldırım & Şimşek, 2011). The instruments were revised based on this feedback, and they were piloted before the actual data collection process started (Kvale, 2007; Maxwell, 2013). Next, a large amount of data were collected in order to provide in-depth analysis. In addition, the data for the first and second research questions, which investigated the SRL strategies of the students studying at the top ranking science highs schools of Türkiye, and SRL-related beliefs of teachers working at the top ranking science highs schools of Türkiye, were collected by mixing qualitative and quantitative methods, which made triangulation of the data possible (Patton, 1990). Thus, with the help of multiple data sources, triangulation was achieved (Bogdan & Biklen, 2007; Patton, 1990). This helped to increase the credibility of the research.

Additionally, in order to meet the transferability criterion so as to ensure trustworthiness, thick description of each and every stage of research as well as participants was provided, as suggested by Patton (1990) and Yıldırım and Şimşek (2011). In addition, the context of the study and the rationale behind choosing this context have been clarified in detail. Last but not least, the confirmability and dependability of the present research were provided with the help of the audit trail method (Lincoln & Guba, 1985). With this purpose in mind, the supervisor of the researcher supported the research process with her knowledge and experience in each

stage, including design, data collection, and data analysis. This contributed to the consistency and objectivity of the results.

Furthermore, certain threats to the study were controlled during the data collection and data analysis stages. These threats were participant characteristics, attitudes of the participants, location, and instrument decay (Patton, 1990). In order to address the threat of participant characteristics, schools were selected, considering the purpose of the research. To clarify, the purpose of the research was to examine how students develop SRL strategies. With this purpose in mind, the top ranking science high schools of Türkiye were selected as the students in these schools are more homogenous compared to other type of schools, which is likely to eliminate the risk of characteristics of subjects affecting the results of the study.

In addition, the attitudes of participants, which can be a threat to the study as participants might give expected answers if they feel that they are being evaluated by the researcher, were controlled by clarifying the purpose of the research for the participants in both written and oral ways (Fraenkel & Wallen, 2006). Also, as suggested by (Creswell, 2013), the anonymity of the participants was guaranteed to them via consent forms. Besides, the researcher started the interview by communicating the aim of the research and asking demographic questions so as to break the ice and establish rapport.

So as to eliminate the location problem, all the participants were interviewed via Zoom (an online application used to have video chats) during the hours when they were available. The participants were asked to join the meetings in the locations where they felt comfortable. This helped the researcher control the location threat so the participants did not feel intimidated by the location of the interview. Lastly, the threat of instrument decay was controlled by involving three experts in the area, as mentioned earlier. This helped the researcher provide intercoder reliability and ensure the consistency of the analysis. Besides, a thick description of the codes, a clear explanation and boundaries of each code as well as quotations from interviews together with their implications, were provided to prevent any possible inconsistency.

In the final stage of the data analysis, the results obtained from qualitative data analysis were reported and discussed, considering the research questions. Relevant quotations were provided to exemplify the categories and codes. A thick description of data was also provided, along with an appropriate description of the situations, as suggested by Patton (1990). Besides, direct quotations of the participants were provided so as to enable the reader to have a better idea of the situations and the results of the study (Creswell, 2013). While reporting the quotes and results, the anonymity of the participants has always been preserved, and the participants were labeled as T1 or S1, and so on. The data analysis of qualitative data was completed in December 2022.

3.9. Limitations of the Study

Even though interview questions were designed to investigate the research problems in detail, the data were collected from science high school teachers only. Collecting data from primary school teachers and middle school teachers could give more insights into the issue. Collecting data from parents would also contribute to the data. In order to surmount this limitation, students were asked detailed questions on the practices of primary school teachers and middle school teachers as well as parents promoting SRL.

The data were collected through two scales and interviews. However, classroom observations and observing students in their natural settings were needed. So as to compensate this, the interview questions were asked in such contexts.

Finally, the SRSS used to collect data from the students included forethought and performance phases only and this scale was used to choose the participants of the interviews. Self-evaluation phase was not included in the scale which could be a contributing factor in determining the most self-regulated students to be interviewed. Also, so as to choose the interviewees the replies of the students on the SRSS were used. Therefore, the selection of the students was based on the students' statements only. Their GPAs or teachers' reports on these students were not used.

CHAPTER 4

RESULTS

Considering the research questions addressed in the study, this chapter presents the results under four main section sections. The first section provides the SRL strategies employed by the students studying at the top ranking high schools of Türkiye and sheds light on the issue of self-regulation as a general concept or domain specific characteristic. The second chapter presents the beliefs of teachers working at the top ranking science high schools of Türkiye on self-regulated learning. The third chapter uncovers the student related factors promoting the SRL strategies of students studying at the top ranking state high schools of Türkiye, while the fourth chapter submits instruction related factors promoting the SRL strategies of students studying at the top ranking state high schools of Türkiye. The chapter also includes a summary of the results.

4.1. The SRL Strategies Employed by the Students Studying at the Top Ranking High Schools of Türkiye

The data of the study were collected from the top ranking high schools of Türkiye, and the students of such schools are accepted into these schools via their exam scores. As the literature shows a strong correlation between academic success and self-regulation, these students are expected to have a certain degree of self-regulation. To this end, they were asked to fill in the Self-regulatory Strategies Scale (SRSS), and 857 students provided data via this scale. With the help of the descriptive statistics obtained, Table 10 shows the self-regulation strategies employed by the students of the top ranking science high schools of Türkiye:

Table 10

SRL Strategies of the Students (in descending order)

	%							
	Always	***Usually***	***Often***	***Sometimes***	***Rarely***	***Never***	***M***	***SD***
I turn off the TV to better focus on studying.	**52.0**	17.7	9.3	8.4	5.3	7.2	4.81	1.59
While studying a topic, I solve the problems in different sources.	**33.1**	25.6	17.4	12.1	6.1	5.7	4.50	1.48
I use different sources to study.	22.3	**30.8**	24.6	15.2	4.0	3.2	4.42	1.26
I stop studying if I get bored.	**28.7**	21.9	16.6	23	8.3	1.5	4.35	1.39
I keep the distractors away while studying.	20.5	**26.8**	23.2	18.1	6.8	4.6	4.23	1.49
I study in a quiet environment.	23.2	**28.5**	18.4	14.6	9.0	6.3	4.22	1.37
While studying a topic, I bring the information from different sources together.	19.0	**28.9**	19.1	20.1	8.3	4.6	4.16	1.40
I take a break if I cannot comprehend a subject.	23.3	**25.1**	17.7	17.7	10.7	5.4	4.16	1.49
I underline the important parts while studying.	18.2	**23.3**	21.5	18.9	10.9	7.2	3.97	1.51
I organize the environment before I start to study.	18.6	22.1	**23.8**	17.5	10.5	7.6	3.97	1.49
I determine what to learn before I start studying.	16.2	22.3	**22.4**	20.7	12.4	6.1	3.91	1.45
I self-teach the topic while studying.	21.0	**21.6**	17.0	19.3	12.8	8.3	3.93	1.58
I motivate myself to study better thinking about the high grade I will take.	14.0	**23.0**	22.5	**23.0**	10.9	6.7	3.86	1.42
I convince myself to study hard to learn the topic.	14.8	22.4	22.1	**23.6**	8.8	8.4	3.85	1.46
I ask questions to myself in order to check my comprehension.	11.8	19.4	20.8	**25.9**	13.9	8.1	3.78	3.07
I remind myself of the importance of getting a good grade while studying.	12.5	18.6	**21.2**	19.7	15.4	12.6	3.55	1.56
I keep my academic sources only on my study desk.	12.1	**21.1**	15.8	17.5	19.1	14.4	3.46	1.62
I plan the method of studying before I start.	9.6	16.3	21.8	**22.9**	18.8	10.6	3.43	1.47
I summarize the topic with my own sentences while studying.	11.6	17.7	17.7	**20.4**	17.4	5.1	3.40	1.59

	%							
	Always	***Usually***	***Often***	***Sometimes***	***Rarely***	***Never***	***M***	***SD***
If I cannot understand the topic, I stop studying.	13.5	13.5	14.1	**27.8**	20.7	10.4	3.40	1.53
I highlight the important the topic with colorful pencils while studying.	14.1	18.2	16.7	16.7	13.8	**20.5**	3.40	1.72
I decide on what to learn before I start studying a task.	8.2	17.4	16.0	**31.2**	17.0	10.3	3.37	1.42
I write down the important definitions while studying.	10.4	15.4	18.6	**24.3**	17.3	14.1	3.35	1.53
I make a to-do list before I start to study.	10.9	15.2	14	**24.2**	21.6	14.2	3.26	1.56
I list the concepts that I do not understand while studying.	6.5	12.3	16.5	**23.7**	23.1	17.9	3.09	2.06
I remind me of the future importance of the topic while studying.	9.3	8.3	13.1	21.1	**23.1**	25.0	2.83	1.56
I summarize the subject by drawing a diagram while studying.	5.3	7.7	9.2	21.8	27.5	**28.5**	2.55	1.45
I motivate myself to study more to be liked by my teacher.	5.6	5.0	10.4	20.2	22.5	**36.3**	2.42	1.46

Mean values ranged between 2.42 and 4.81. As seen in Table 10, turning off the TV to better focus (*M*=4.81), solving the problems in different sources (*M*=4.81), using different sources to study (*M*=4.42), stopping studying when getting bored (*M*=4.35), keeping the distractors away while studying (*M*=4.23), and finding a quiet environment to study (*M*=4.22) are the strategies used relatively higher by a considerable number of the students. These results show that students first arrange the environment by finding a quiet place to study and putting the distractors away. They use different sources to study and take breaks when they feel the need because they are bored. When we consider the strategies that are least employed by the students, we can conclude that motivating oneself to study more so as to be liked by the teacher is the least used task strategy that students employed (*M*=2.42). Also, summarizing the subject by drawing a diagram while studying (*M*=2.55) and listing the concepts that they do not understand while studying (*M*=3.09) are among the strategies that a considerable number of students do not prefer. These results can be explained by

referring to the interview results. The results of the interviews conducted with the students showed that the majority of the students (*f*=13) have inner motivation, and they have their own goals related to their own future. They have a more professional attitude towards learning as they consider it a means to attain a more important goal. For this reason, they do not struggle to earn the appreciation of the teacher. Their main motivation source is the goals they set. In addition, when it comes to the strategies such as summarizing the subject by drawing a diagram and listing the concepts, some students (*f*=6) explained that they want to employ such strategies, yet they have a great deal to learn in a relatively short period of time. For this reason, they cannot find time to study using such strategies. Last but not least, "*I decide on what to learn before I start studying a task"* has a relatively lower mean. This is a surprising result because the students reported that the first thing they do is to set a goal. However, when we consider these results from a broader perspective considering the results of the interviews conducted with the students, it is possible to state that the students set broader goals like becoming a doctor or being accepted into a top ranking university. They naturally plan what to do before they start, but their plans might focus on solving problems or answering multiple-choice questions. The majority of the students (*f*=13) particularly emphasized that they learn the subject in class, and then they assign multiple choice questions to solve each day. For this reason, the term "learning" is likely to affect the result in this item as it is not about learning but practicing what they have already learned in class.

When we consider the constructs of the *SRSS*, we can see that the higher percentages of the answers are accumulated in the following constructs: motivation regulation, planning, effort regulation, attention focusing, task strategies, using additional sources, and self-instruction. Motivation regulation and planning strategies are employed during the forethought phase, while effort regulation, attention focusing, summary strategy, highlighting strategy, utilizing extra resources, and self-instruction strategies are benefited while they are in the performance phase. In light of the constructs given above, it is appropriate to state that motivation regulation, attention focusing, and using additional sources are the constructs that were emphasized the most by the students.

During the interviews with students, elaboration of these results, as well as other strategies employed by students, were obtained. In the next part, these findings are reported considering the cyclical self-regulatory phases of Zimmerman's model, which consists of forethought, performance/volitional control, and self-reflection parts. To clarify, the SRL strategies mentioned by the students are presented considering these processes and start with strategies of forethought period, namely goal setting, and strategic planning. Then it continues with the strategies of performance/volitional control period-namely self-control, environmental organization, and attention focusing and task strategies. Later, the chapter is concluded with the strategies that students employed in the self-reflection part, i.e. self-evaluation.

4.1.1. Goal Setting

Goal setting was an SRL strategy that all the participants (*f*=15) in the study stated. The students mentioned that they have *long-term* and *short-term goals*. *Short-term goals* were related to their success in their science high school. *Long-term goals* were about the university that they want to be accepted into or the final job position that they want to have:

> I have multiple goals, in fact. I want to be a software engineer at the end, but I also want to study in one of the top universities. For this reason, I want to rank within the first 500 students in Türkiye in the university entrance exam. I always study keeping this in mind. *[Benim aslında çok hayalim var. Yazılım mühendisi olmak istiyorum mutlaka ama en iyi üniversitelerden birinde okumak istiyorum. Bu yüzden de mıtlaka ilk 500 öğrenci arasına girmek istiyorum. Ders çalışırken hep bunları aklıma getiriyorum.]* (Student 14)

> I never study without setting my goals first. I always study for a goal. This is how I do things. I set my goals the one day earlier for the next day. I first choose the topics to study, then I order the topics considering importance or ease. Then I set my goals to reach for that day. I know my capacity well, so I set realistic goals considering that. When I wake up for a new day, everything I am going to do is set. The only thing to do is to do my list. Thus, I can say that setting daily goals is important for me. *[Ben hedeflerimi belirlemeden asla çalışmaya başlamam. Her zaman hedefe yönelik çalışırım. Düzenim bu şekilde. Bir gün öncesinden ertesi günün hedeflerini koyarım. Öncelikle çalışılacak konuları seçerim sonra da konuları kolaylık sırasına göre ya da önem sırasına göre sıralarım. Sonra da o gün nereye kadar geleceğim onu belirlerim. Ben kendi kapasitemi iyi biliyorum o yüzden ona göre hani gerçekçi hedefler belirlerim.*

> *Bir sonraki gün uyandığım zaman ne yapacağım hep belli olur. Bana sadece bu listeyi gerçekleştirmek kalır. Bu yüzden hani hedef koymak benim için çok öenmli diyebilirim.]* (Student 9)

> I set daily goals since middle school. I study regularly every day. I make list of the things that I want to achieve that day. This might include the sources that I will use or the topics I will cover. Then I do my best to reach my goal. I make revisions when necessary. [*Ortaokuldan beri kendime günlük hedefler koyarım. Her gün düzenli çalışırım. Koyduğum hedefler o gün kullanacağım kaynaklar veya çalışacağım konular hakkında oluyor genelde. Koyduğum hedefe ulaşmak için elimden geleni yaparım ama olmazsa tekrar düzenlerim hedeflerimi.]* (Student 15)

As seen in the quotes, the students set goals related to the future, and their ultimate goal is to reach them, but they also set daily goals such as completing a certain task, learning a new topic, or completing a certain number of tests. These goals are the first step of their regulation process. They plan the process in their minds, and goal setting is the product of this cognitive process. Then they start to regulate their behavior in line with these goals.

4.1.1.1.Multiple Motivational Beliefs

Having multiple motivational beliefs to reach a goal was observed to be a part of the goal setting process. The students (*f*=15) have more than one reason to set their goals, and they have multiple beliefs to motivate themselves to achieve such goals. As seen in some of the quotes taken from student interviews, all the students (*f*=15) have mentioned that they have a specific goal related to the future career that they want to pursue, and this process is supported by more than one motivational belief. The majority of participants (*f*=11) also stressed that they think about this goal or remind themselves of this goal regularly in order to motivate themselves to keep studying. In addition, it is important to highlight that the majority of students mentioned that they have multiple motivational beliefs, which are influential in setting these goals. These motivational beliefs are mostly linked with the beliefs related to the future careers they aim for. To illustrate, the students set such goals as they believe these jobs fit into their personalities, interests, or aptitudes, they want to help other people, or they have great respect for the people who do these jobs. They do not have a single motivation to reach

their goal, but they have a couple of motivational beliefs which help them keep going through the goal:

> I can say that learning about human nature is a big passion for me, so I want to become a doctor. Actually, I want to become a surgeon. I am good at doing manual jobs and I have a great interest in human anatomy. I am also into details. Thus, I think I am tailor made for this job. Besides, this is a well-respected job. I know faculties of medicine accept students with very high scores, so I study hard to jump over this wall in front of me. *[İnsan doğasını öğrenmek benim için bir tutku diyebilirim. Bu nedenle de doktor olmak istiyorum. Aslında ben cerrah olmak istiyorum. Ben böyle elle yapılan işlerde iyiyim, el becerim iyi ve hani insan vücuduna çok ilgim var. Bir de böyke ayrıntlarda iyi olan biritim. Bundan dolayı bu iş için çok uygun olduğumu düşünüyorum. Bir de bence doktorluk çok saygıdeğer bir iş. Tıp fakülteleri çok yüksek puanla öğrenci alıyor biliyorum. Bu yüzden önümdeki bu duvarı aşmak için çok çalışıyorum.]* (Student 10)

> I want to be an entrepreneur. I like creating codes and animations. I want to start a company in which I can combine entrepreneurship and software. In my company, I aim to connect my jobs together. Keeping this aim in mind, I need to study hard so as to study in a top ranking university of Türkiye. Studying in a top ranking university is crucial for me to broaden my horizons. Therefore, while I am studying or planning my day, I feel that I am pursuing my dreams. *[Ben girişimci olmak istiyorum. Animasyon yapmayı kod yazmayı seviyorum. Ben böyle bir şirket kurmak istiyorum bunda da yazılımı ve girişimciliği birleştirmek istiyorum. İşimde bu meslekleri birleştirmek benim gayem. Işte bunu başarmak için çok çalışıyorum bunu aklımda tutuyorum hep ve bunun için Türkiye'nin en iyi üniversitelerinden birine girmek istiyorum. En iyi okulların birinde okumak benim ufkumu genişletmem için çok önemli. Bu yüzden günümü planlayarak çalışıyorum. Böylece hayallerimin peşinden koştuğu hissediyorum.]* (Student 11)

> I have always wanted to study at the faculty of medicine. It has been my dream since childhood. I think the major factor me to set this goal was our frequent visits to hospital when I was a kid. I used to go to hospitals very often as I often got sick when I was a kid. For this reason. I grew a kind of admiration for the doctors. For this reason, I wanted to be just like them. I want to be beneficial for people, too. I think is a great department and a great job. Whenever I feel tired of studying, I remind myself of this goal. *[Ben hep tıp fakültesinde okumak istedim. Bu benim çocukluktan beri hayalim. Sanırım bu hedefi koymamda çocukken çok sık hasteneye gitmemiz etkili oldu. Ben çocukken çok hastaneye giderdim, çok hastalanırdım. Bu yüzden sanırım doktorlara karşı bir hayranlığım oluştu. Bu yüzden de onlar gibi olmak istedim sanırım. Ayrıca insanlara faydalı da olmak istiyorum. Bence tıp çok güzel bir bölüm, çok güzel bir iş. Ben ne zaman çalışmaktan yorulsam kendime bunu hatırlatırım.] (Student 6)*

As seen in the quotes, the students present more than one belief to set a certain goal. To illustrate, the *Student 10* underlines that she wants to become a surgeon because she is a person who likes paying attention to details and she has a great interest in human anatomy. She believes that this job fits into her personality. Besides, she believes that this is a well-respected job. Having these multiple motivations in mind, she sets her goal to become a doctor. Based on the student interviews, it is possible to state that setting a goal and having more than one reason to attain that goal are the driving force for the students to regulate their behavior. Some of them (*f*=5) openly expressed that they think about their goal and their motivation sources to achieve that goal so as to keep studying in a well-organized manner.

4.1.1.2.Strategic Planning

Strategic planning is another theme that appeared hand in hand with goal setting and as a task strategy. While they are setting goals, they also strategically plan how to reach such goals. Thus, it is possible to indicate that having *multiple motivational beliefs*, *setting goals*, and *employing strategic* planning tactics are SRL processes that are closely connected to one another, and they mostly take place concurrently. The following quotes demonstrate this notion:

> I decided to become a doctor when I was a little kid. I have been studying to achieve this dream regularly since middle school. I thought if I was able to study in a good high school, I would stand a better chance in the university entrance exam so as to study in a good faculty of medicine. I know this is not going to be easy, so I study regularly. I set daily goals. I feel that I am getting closer to my goal step by step. *[Ben daha çok küçükken karar verdim doktor olmaya. Ortaokuldan beri bu hayalimi gerçekleştirmek için düzenli çalışıyorum. Eğer iyi bir liseye girersem tıp fakültesi için daha yüksek şansım olur diye düşündüm. Bunun klay olmayacağının farkındayım, bu yüzden de düzenli çalışıyorum. Her gün kendime hedefler koyarım. Ben böyle adım adım hedefime yaklaştığımı hissediyorum.]* (Student 1)

> My goal is to be within the first 500 students in Türkiye and to study engineering in Bosporus University. I believe that is the best career path for me as I like the way engineers think and I think I have the same style of thinking. With this goal in mind, I study regularly. I have plans for the whole month, whole week and whole day. I review my plans from time to time. But I stick to my schedule to achieve my dreams. [*Benim hedefim Türkiye'de ilk 500 öğrenci arasına girmek bir de Boğaziçi Üniversitesi'nde mühendislik okumak. Bence benim için en uygun meslek mühendislik çünkü bence mühendislerin düşünme*

tarzını seviyorum ve bence bende de bu var. Bu hedefe yönelik çalışıyorum ben bunun için düzenli çalışıyorum. Tüm ayı, haftaları ve günü planlarım, gerelise planlarımı yenilerim ama hayallerimi gerçekleştireceğim deyip planlarıma sadık kalırım genelde.] (Student 2)

I want to study in the faculty of medicine, but it is an expensive faculty. Books and all the other stuff cost a lot of money and I have four other siblings, so my family may not be able to afford sending all of us to the universities in big cities. For this reason, I am studying hard to be one of the top ranking students in Türkiye so that I can get a scholarship. I have three years till the university entrance exam, and I have a comprehensive plan for it. I will have completed all the topics before my last year at high school. In addition to that, I have daily plans which I make considering that day's lesson program. I rank the topics and lessons. I make a detailed plan. I think it is an important key to success. I always have a plan. *[Ben tıp fakültesinde okumak istiyorum ama tıp fakültesi pahalı bir fakülte. Kitaplar falan çok para tutuyor. Benim dört kardeşim daha var. Bu yüzden ailem hepimizi büyük şehirlerde okumaya yollayamayabilir. Bu yüzden Türkiye'nin en iyi üniversitelerinde birine girmek istiyorum ki burs alabileyim. Üniversite sınavına kadar 3 yılım var. Kapsamlı bir plan yaptım bunun için. Lise sondan önce ben bütün konularımı bitirmiş olacağım. Bir de o günün ders programına göre yaptığım günlük planlarım oluyor. Konuları ve dersleri sıralıyorum. Ayrıntılı bir plan yapıyorum. Bence bu başarının anahtarlarından biri, benim hep bir planım var.]* (Student 4)

I like to study at a faculty of medicine in another city. I want to see different cities and meet different people. These are motivating me to study regularly. My planning could be different from the others as I plan my studies considering the hours when I can study most efficiently. For example, I am a morning person. I can study very efficiently in the mornings. For this reason, I study essential lessons such as Physics, Chemistry and Biology usually in the morning. However, I feel a bit tired at nights, so I usually plan to study Math at nights as I am already good at Math. This helps me to study efficiently. *[Ben başka bir şehirde tıp okumak istiyorum. Başka şehirler görmek istiyorum, yeni insanlar tanımak istiyorum. Bunlar beni motive ediyor çalışmak için. Benim çalışma düzenim diğerlerinde farklı olabilir çünkü ben çalışmak için en verimli saatlerimi düşünerek plan yapıyorum. Mesela ben sabah insanıyım, sabahları çok verimli çalışırım. Bu yüzden sabah mesela Kimya, Fizik, Biyoloji gibi önemli dersleri çalışırım sabahları genelde. Ama akşamları biraz yorgun hissederim, o yüzden genelde akşamları matematik çalışırım. Matematikte çokk iyiyimdir. Böylece işte verimli çalışırım ben.]* Student 10)

Taking the analysis of the student interviews into consideration, it is appropriate to underscore that all the interviewees (*f*=15) stated that they have a clear academic goal. Besides, they do not just dream about it but take concrete steps toward their goals. All the participants (*f*=15) expressed that they have strategic plans to attain their goals, and they revise, recreate or reshape their plans in accordance with a range of variables,

such as upcoming lesson schedules or their daily performances, to follow their plans. This shows us that these three processes- namely, goal setting, having multiple motivational beliefs, and strategic planning are SRL processes that feed each other.

4.1.2. Self-Control

Another SRL strategy that came up during the student interviews is *self-control*. Self-control is a general concept, but in the context of SRL strategies, it is used as the process of controlling one's emotions and actions to perform the necessary actions to achieve a particular goal. In this context, this goal is studying or learning a new academic subject. During the interviews conducted with the students, a considerable number of participants (*f*=9) expressed that they exercise self-control even under the circumstances that they do not fancy studying, feel tired, or have less motivation to do so. They also underlined that they feel the need to take responsibility for their own learning which facilitates self-control process. Some of them (*f*=6) have expressed that they have been doing it since their childhood. They have developed self-control, and they orient themselves through the task at hand by willingly controlling their own actions and emotions:

> I have attended many courses since my childhood, so I have always had a busy schedule. This means that I need to use my time efficiently and generally I have no time to wander. When I do not want to study or complete a task, I simply ignore this feeling because I have to do it. One way or another I control myself and complete the things that I planned earlier. *[Çocukluğumdan beri birçok kursa gittim o yüzden de hep yoğun bir programım oldu. Bundan dolayı da hani hep zamanımı verimli kullanmam gerekirdi. Genelde başıboş takılacak zamanım olmaz. Canım çalışmak istemediği zaman bunu görmezden gelirim öylece çünkü yapmak zorundayım. Bir şekilde kendimi control ederim ve planladığım şeyleri tamamlarım.]* (Student 15)

> I do my best to follow my schedule and I follow it unless something very extraordinary happens. I do not take many breaks not to lose self-control. For example, I do not study for 30 minutes and take a 10 minutes break. I study at least two or three hours without taking a break. We are also human beings and it is a difficult thing to study this much, but in the exams, we are supposed to sit two or three hours without a break, so I study accordingly. I think this is the most efficient way. *[Programımı takip etmek için elimden geleni yaparım ve hani çok büyük bir şey olmadıkça takip ederim mutlaka. Çok fazla ara vermem o kontrolü kaynetmek istemem. Mesela, 30 dakika çalışıp 10dakika ara vermem. Iki ya da üç saat aralıksız çalışırım ara vermeden. Biz de insanız*

> *sonuçta ve bazen bu kadar çalışmak çok zor olabiliyor ama sınavlarda iki üç saat aralıksız oturmamız gerektiği için ben de buna göre çalışıyorum. Bence en verimli bu şekilde oluyor.*] (Student 3)

As seen in the quotes, the students indicated they practice self-control so as to keep regulating their behaviours. Additionally, they utilize certain strategies to be able control themselves. To illustrate, one student underlined that he is well aware of the fact that he has to study to pursue his dreams. For this reason, he does not give himself any chance to procrastinate. He stays in his room four or five hours and he does not go out without completing the tasks that he designated for that day. Thus, it is possible to conclude that self-control is something that students deliberately work on.

4.1.2.1.Task Orientation

In relation to *self-control*, some student participants (*f*=7) also articulated how they perform *task orientation*, which refers to the process of practicing self-control to orient oneself to study. This may also include the times when the student perceives distractions, but overcomes them by positioning himself or herself to study.

> In order to study efficiently, first I rest well. However, I do not play video games or watch online videos while resting. I focus my mind on taking a good rest and starting to study in an efficient way afterwards. When I feel that I rested enough, I immediately rise from the bed and start getting ready to study. [*Verimli çalışabilmek için önce bir güzel dinlenirim. Ama dinlenirken bilgisayar oyunu oynamam ya da telefona bakmam. Kafamı güzelce dinlenmeye sonrasında da verimli çalışmaya odaklarım. Güzelce dinlendiğimde kendimi hazır hissettiğimde yataktan kalkarım ve çalışmaya hazırlanırım*.] (Student, 4)

> I follow a certain routine so as not to get distracted. I come home, rest a bit and then have dinner with my family. When the tea is ready, I start to study. Drinking tea or coffee helps me to get ready to study mentally. Then I start to study and I do not give long breaks till I complete the part that I am supposed to complete on that day. *[Benim bir rutinim var ve dağılmamak için o rutini bozmuyorum. Eve gelirim, biraz dinlenirim, ailemle yemek yeriz. Çay hazır olunca çalışmaya başlarım. Çay ya da kahve içmek bence beni zihinsel olarak çalışmaya hazırlıyor. Sonra çalışmaya başlarım ve o günkü çalışmamı tamamlayıncaya kadar uzun aralar vermem.]* (Student, 12)

As mentioned earlier, students purposefully utilize certain tactics to control themselves. Similarly, they make use of some tactics to orient themselves towards the

task. Another student mentioned that she does some physical exercises before she is able to start studying. She stretches her muscles which helps her to orient herself towards the task. These results show us that as a part of SRL process the students willingly follow certain routines to ease task orientation process.

4.1.2.2.Taking the Responsibility for One's Own Learning

The interviews conducted with the students revealed that the majority of the students (*f*=12) orient themselves to the tasks by taking responsibility for their own learning. To elaborate, they feel responsible for learning and completing their tasks, and they do not expect anyone to share this responsibility. Most of the participants (*f*=10) also stressed that they attribute both success and failure to themselves rather than their parents or teachers.

> No one in my family takes the responsibility for my studies. Neither my mother nor my father… And I do not think teachers have to try so hard to teach us. We have to try hard to learn. Since my childhood, I have been taking my own responsibility. Thus, if I rank first in an exam or achieve another type of success, this success belongs to me not any other person. *[Benim ailemden hiç kimse benim derslerimin sorumluluğunu almaz. Annem de almaz babam da almaz. Öğretmenler de bize öğretmek için aşırı çabalaması gerekmiyor bence. Bizim öğrenmek için çok çabalamamız gerekiyor. Çocukluğumdan beri kendi sorumluluğumu alırım. Bu yüzden bir sınavda birinci olduğumda ya da bir başarı elde ettiğimde bu başarı benim olur başka birinin değil.]* (Student 2)

> I do not study because my family commands me to do so. I am far away from them. I am responsible for myself and this involves my success, too. I feel that this is my life and I am going to be successful, I should do it for myself not for any other person. Also, if I fail, this is my failure. Not my parents' failure… Therefore, I plan my own learning, I study. [*Ben ailem çalış dediği için çalışmıyorum. Zaten onlardan da çok uzaktayım. Ben kendimden sorumluyum ve başarım da buna dahil. Ben şöyle hissediyorum; bu benim hayatım ve ben başarılı olacağım. Bunu kendim için yapmalıyım başkası için değil. Ayrıca, başarısız olursam bu benim başarısızlığım ailemin değil… bu nedenle kendim planlarım kendim çalışırım.*] (Student 10)

> My parents have never told me to study. This is one of the things that my mother feels proud. They buy me resources and prove a place to study. They do not have to monitor me as if I was a baby. I know my responsibilities, so I can monitor myself. That has been what I have been doing since primary school. [*Benim ailem hiç bana çalış demedi. Annemin en çok gururlandığı şeylerden biri de budur. Onlar bana kaynaklar aldılar ve çalışacak bir ortam sağladılar. Bebek gibi beni izlemeleri gerekmedi. Ben sorumluluklarımı*

biliyorum ve kendi kendimi takip edebilirim ilkokuldan beri ben böyle yapıyorum.] (Student 1)

Taking the responsibility of their own learning has been put forward as a strong indicator of self-regulation. The majority of the students (*f*=11) explained that they feel responsible for their success and act accordingly as a reply to question investigating how they developed SRL skills. Thus, the majority of the students (*f*=11) have made it clear during the interviews that they manage and supervise their own behavior and settle themselves to study, feeling accountability for their own studies. Some students openly expressed that whenever they feel like they do not want to study, they remind themselves that they have to study. Once again, they remember that studying is their responsibility and they need to fulfill their responsibilities. Then they gradually start to do task related duties. This process has been set forth as a key one impacting the self-regulated learning process of the students.

4.1.3. Environmental Organization

In all the interviews, the *environmental organization* has been given emphasis. It has been described as an essential strategy that helps students to start studying efficiently. The students (*f*=15) stated that after they *set goals, plan strategically* to reach that particular goal, and *orient themselves* to start doing the required task, they *organize their physical environment*. This strategy has also been emphasized in the Student Self-Regulation Scale (SSRS) administered to the students. Results of the scale also showed that students organize their environment by turning off the TV (*M*=4.23), finding a quiet place to study (*M*=4.22), and keeping the distractors away (*M*=4.23). The results of the interview justified these results, and the students also elaborated on this strategy:

> I need to quiet place to study. However, I cannot study in libraries, too because I watch people coming and going. I find a place where I do not have any distractors. Usually, I position myself against a wall. I arrange the table in anyone to see which helps me to focus. [*Benim çalışmak için sessiz bir yere ihtiyacım oluyor. Ama kütüphanede de çalışamam çünkü gelen geçeni izlerim. Kimseyi göremeyeceğim bir yere geçerim bu da konsantre olmama yardımcı olur.*] (Student 7)

> Since middle school, I have always tidied the environment where I will study. I cannot focus on my studies when the room is messy. When the environment is tidy, I know or I feel I can say I am going to study. [*Ortaokuldan beri önce*

çalışacağım yeri düzenlerim. Eğer oda dağınık olursa çalışamam. Eğer ortam topluysa çalışacağımı bilirim ya da hissederim diyelim.] (Student 3)

I prepare all my sources which I am going to use. I organize the environment. I love colorful pencils and post-it papers. I prepare them as well. Once I feel that it is well organized and I like the organization, I feel ready to start. [*Kullanacağım bütün kaynakları hazırlarım. Çevreyi düzenlerim. Renkli kalemleri post-itleri çok severim onları da hazırlarım. Düzeni sağlayınca ya işte oldu deyince, başlamaya hazır hissederim.*] (Student 9)

I have realized that when there is a bed in the room where I am going to study, I cannot study there. For this reason, I study in a room where there is no bed. …I also like big desks. This motivates me, too. Besides, I wear comfortable clothes and even have a studying hair. When all these conditions are provided, I feel ready to study efficiently. [*Ben şunu fark ettim çalışacağım odada yatak olursa ben çalışamıyorum. Bu yüzden yatak olmayan bir yerde çalışırım. ..Bir de ben büyük sıraları seviyorum. Bu da beni motive ediyor. Rahat kıyafetlerimi giyerim hatta çalışma saçım bile vardır. Bütün bu şartlar sağlanınca, kendimi verimli çalışmaya hazır hissederim.*] (Student 6)

I have a unique way of arranging my study environment. I put the sources that I am going to use first on my right side. I place the ones that I am going to use later on my left side. If I have extra sources that I can refer to if I cannot comprehend a topic, I place these extra sources right in front of me. When I am done with a source, I put it away. I study for one hour or more, and I take a break if I feel the need. During my break, I organize the environment again because I am not comfortable with studying in a messy environment. I do not like it. I cannot study on a dirty or messy table. I put my pens and pencils into specific places. I should easily find them when I want to. [*Benim çok değişik bir çalışma düzenim var. Yani çalışma ortamı düzenim. İlk kullanacağım bütün kaynakları sağ tarafıma koyarım. Daha sonra kullanacağım kaynakları ise sol tarafıma koyarım. Eğer mesela konuyu anlamadığımda bakacağım ek kaynaklarım varsa onları tam önüme koyarım. Bir kaynakla işim bitince onu uzağa koyarım. Bir iki saat çalışırım eğer yorgun hissedersem ara veririm. Ara verdiğimde çalışma ortamımı tekrar düzenlerim çünkü dağınık ortamda çalışırken rahat hissetmem sevmiyorum yani. Kirli ya da dağınık masada çalışamam. Tükenmez kalemlerimi kurşun kalemlerimi de belli yerlerede koyarım. Eğer ihtiyacım olursa hemen bulmalıyım çünkü her şeyi.*] (Student 14)

Considering the results of the analysis of the student interviews as well as the SSRS, it is possible to state that *environmental organization* is a crucial strategy that the students utilize. Although the way of organization depends on the student, the students (*f*=15) share the organization of sources, studying in a tidy place, and finding a quiet place to study as their common strategy.

4.1.4. Attention Focusing

Attention focusing is another SRL strategy that has been mentioned by many students (*f*=10). This strategy is employed by the students in two different contexts. First, several students (*f*=6) mentioned that they employ several methods to focus their attention during the lesson:

> I think giving your full attention to the lesson is a must to be successful. I always do that. Otherwise, it takes a lot of time to learn the topic all by yourself. I generally prefer sitting on the front desks as teachers focus on the desks at the back and this distracts my attention. For this reason, I sit on the front and take notes of my own. I do not like other people's notes. I think everyone can learn better by looking at their own notes. [*Bence başarılı olmak için derse dikkatini tam vermek zorunlu. Ben hep böyle yapıyorum. Yoksa o konuyu kendi kedime öğrenmem acayip zaman alıyor. Bir de ben genelde öne oturmayı tercih ederim çünkü hocalar genelde arka sıralara odaklanıyor bu da benim dikkatimi dağıtıyor. Bu yüzden ben en önde otururum, kendi notumu alırım. Başka insanların notlarını sevmem. Bence herkes kendi notuna bakarak daha iyi öğrenir.*] (Student 11)

> During the lesson, I focus on the teacher and I do not talk to my friends or exchange notes. I concentrate on what is being taught. This greatly helps me to learn. [*Ders sırasında ben hocaya odaklanırım ve öyle arkadaşlarıma konuşmam ya da yazışmam. Ne öğretiliyorsa ona odaklanırım. Bu öğrenmeme bayağı yardımcı olur.*] (Student 4)

Second, the analysis of the student interviews demonstrated that some students (*f*=4) utilize certain strategies to focus their attention while they are studying:

> In order to focus better, I start studying easy subjects and then continue with harder ones. [*Daha iyi konsantre olabilmek için kolay konularla başlıyorum sonra daha zorları ile devam ederim*.] (Student 10)

> Before I really start studying, I solve my Geometry problems. This makes me feel very smart and enriches my concentration. [*Gerçekten çalışmaya başlamadan önce Geometri problemleri çözerim. Bu benim kendimi çok zeki hissettirir bir de konsantrasyonumu arttırır.]* (Student 11)

> If I feel that I need to do something, I do it first. This could be revising a topic or clarifying a point that I could not really understand during the lesson. After I do that, I start studying. Otherwise, I cannot focus. [*Yapmam gereken bir şey olduğunu hissedersem ilk onu yaparım. Bu bir konuyu tekrar etmek olabilir ya da işte derste anlamadığım bir şeye bakmak olabilir. Bunu yaptıktan sonra çalışmaya başlarım. Yoksa odaklanamam.*] (Student 9)

> When I am studying, I just focus on studying. I pay special attention to staying at that moment because otherwise it is just a waste of time. This is my motto. Focus on what you are doing. Do not get distracted. [*Ben ders çalışırken saadece çalışmaya odaklanırım. Anda kalmaya özen gösteririm yoksa bu zaman kaybı olur. Benim sloganım bu. Yaptığın işe konsantre ol. Dağılma.*] (Student 4)

Based on the analysis of the student interviews, it is possible to conclude that the students are well aware of the fact that concentrating on something is a difficult job. They are also aware they might have difficulties to focus. For this reason, as a part of their SRL process, they have their own style of focusing their attention.

4.1.5. Prior Content Knowledge Activation

Prior content knowledge activation emerged as an important theme during the analysis of the student interviews. Most of the students (*f*=13) underlined that activating their prior knowledge and then building on it is essential to master a topic, but this is also strategy that eases their self-regulation process. They stated that they start with the known and then continue with the unknown which helps them focus better and they become more willing to regulate their behaviors as they start with something familiar. That is less threatening. The majority of the students reported that this strategy is the first thing they do when they start studying:

> My study schedule is based on two principles revising what I already know and having an idea of new the topics before the teacher covers them in class. I planned all my holidays considering this principle. I remember what I already know first and then I either look for more details on that subject or answer some multiple choice questions on it. I revise my notes to remember things or I simply read the topics for a source that I like… When all the topics are totally new for me, I do not feel like studying, so that is my solution. Thus, I can start studying easier. [*Benim iki tane ders çalışma kuralım var: birincisi öğrendiklerimi tekrar etmek, ikincisi hoca derste anlatmadan önce konulara bakmak. Ben bütün tatillerimi bu kurallara göre organize ediyorum. Önce bildiklerimi biraz tekrar ederim. Daha ayrıntılı bakarım ya da biraz test çözerim. Notlarıma bakarım hatırlamak için ya da sevdiğim bir kaynaktan okurum konuları... Konular bana tamamen yabancı olunca canım pek çalışmak istemiyor. Ben de bu şekilde yapıyorum. Daha kolay başlıyorum çalışmaya*.] (Student 9)

> When I start studying, first I check what I already know. I look at the headings of the different sources for that. Thus, I remember what I learned earlier. And then I continue to study depending on the extent I remember. If I remember the

> majority of the subject, I do a quick revision and start to solve problems. If I cannot remember many things, I check sample questions on that subject and try to grasp the topic by analyzing sample questions. This makes me feel that I always have a plan. Thus, I start to study with a peaceful mind. [*Çalışmaya başladığım zaman ben ilk olarak ne biliyorum ona bakarım. Farklı kaynakların konu başlıklarına bakarım bunun için. Böylece daha önce öğrendiklerimi hatırlarım. Sonra da hatırladığım ölçüde çalışmaya devam ederim. Konunun çoğunluğunu hatırlıyorsam, hızlı bir tekrar yaparım sonra problem çözerim. Hiçbir şey hatırlamıyorsam örnek sorulara bakarım ve konuyu örnek sorulardan kavramaya çalışırım… Böylece hep güzel bir planım olduğunu hissediyorum. Kafam daha rahat başlıyorum çalışmaya.*] (Student 3)

4.1.6. Task Strategies

The analysis of the student interviews showed that the students utilize a range of strategies so as to complete the task at hand. *Use of various task strategies* have been noted as one of the most significant findings of this study as the students strongly emphasized that they have their own style of combining task strategies. They use this combination of strategies to regulate their behavior and handle the task at hand. This task could be while mastering a content or preparing for the university entrance exam. The students use these strategies to organize their behaviors in order to learn the topics or solve complicated problems. The majority of the students (*f*=9) reported that they *self-experiment* the methods and keep utilizing the ones that they think useful.

When it comes to the specific strategies they utilize, firstly it can be underlined that many strategies reported by the students are in line with the results of the SSRS. To elaborate, many students (*f*=11) underscored that *deciding on what to learn before starting to study or making a to-do list* is essential for their self-regulation process. This activity both directs them to learning and keeps them on track. For this reason, the students emphasized that they are good planners. Some of them (*f*=3) even stated that they predetermine the method of studying before they start.

> While I am planning my studying schedule, I also plan the methods of learning. I check the content of the subjects and I determine a method of studying and then I start studying. [*Ben çalışma programımı planlarken, öğrenme yöntemimi de planlarım. Bakarım önce konulara sonra bi metot belirlerim ondan sonra başlarım çalışmaya.*](Student 7)

In addition, a considerable number of students (*f*=9) expressed that they *benefit from different sources* to master the content. Most of the time, they also plan which sources to use, so this process is intertwined with planning process. This strategy was also highlighted as a facilitator of the SRL process because it eases the process of learning. Similarly, *underlining the important parts* (*f*=8) was reported as an important task strategy since it was described as a contributing factor to tell the difference between new and important information from the already known information. The students reported that this makes it easier to revise before the exam and helps them manage the information. Some of them (*f*=6) also indicated that they use colorful pencils for that purpose.

In addition, *taking and revising notes* is another strategy on which students put emphasis. Many students (*f*=11) asserted that notetaking is a task strategy that enable them to study later on. To elaborate, notetaking is a fundamental strategy which both help them learn and self-regulate as they get prepared to regulate their behavior to study by creating notes. The interviews with students revealed that students do not just write the things the teachers say for the sake of taking notes or they do not copy sentences from different sources. Based on the student interviews, there are two different types of notetaking as an effective task strategy. First students, take notes of the important information during the lessons. This is their first step to regulate their behavior and continue studying after lessons because they take these notes to revise them later.

> I always listen to my teachers attentively and take notes. My method of learning is reading my notes and then answering multiple choice questions or solving problems related to that the topic. As I often use these strategies, I can do these really fast. *[Ben öğretmenlerimi hep dikkatle dinlerim ve not alırım. Benim öğrenme şeklim notlarımı okumak, sonra da konuyla ilgili test ya da problem çözmek. Çok da hızlı giderim.*] (Student 6)

In the second type of notetaking, the students take notes to do self-study and this takes place as a part of SRL process because they regulate their behaviors to bring information together. While they are taking such notes, they use other strategies too such as summarizing the content with their own words (*f*=5) or taking notes of key concepts (*f*=5).

> I study from different sources and take notes of key concepts. I also write a few short reminders next to them. This helps me a lot. *Çeşitli kaynaklardan çalışırım notlar alırım önemli yerleri. Yanlarına bir kaç hatırlatma yazarım. Bu bayağı yardımcı oluyor.* (Student 5)

Last but not least, some students (*f*=5) reported that they *self-teach* the topic so as to learn better and keep studying. They clearly describe a topic or steps to solve a complex problem to themselves.

At this point, it is vital to state that although the students declared to use a variety of important task strategies, the results of the present study showed that what makes these students self-regulated is not only the type of strategies they use. There are two things that make these students uniquely self-regulated. First, they willingly *self-experiment the task strategies* till they find the optimum one for themselves. They do not only choose the best one to learn better, but they also choose the ones that will help them organize their acts better. Then they make amendments to the way they apply that particular strategy until they excel at using it. Second, they do not rely on one single strategy only. They effectively *use multiple strategies* at the same time to attain their goals. To illustrate, as seen in the quotation below, Student 15 is self-teaching the topic and predetermining the method of learning at the same time and s/he underlines that s/he developed this strategy by experimenting:

> I have developed my own method of learning by trial and error method. For example, there is a topic called "projectile motion" in Physics. There are certain formulas to solve the problems related to this the topic. I use various sources to master the topic and then when I start to solve problems, I tell myself that "the questions is asking this, you can utilize that method." And then I solve the problem step by step. I explain the topic to myself in my mind. [*Ben deneye yanıla kendi methodumu geliştirdim. Örneğin Fizikte bir konu var "atışlar" konusu. Bu konunun problemlerini çözmek için çeşitli formüller var. Ben çeşiti kaynaklar kullanıyorum konuyu iyice öğrenmek için. Sonra da problem çözmeye başlayınca kendime diyorum soru şunu soruyor sen şu formülü kullanabilirsin. Sonra adım adım çözüyorum işte problemi. İçimden kendi kendime anlatıyorum konuyu.*] (Student 15)

In the same way, *Student 1* mentions how he takes notes, and underlines important parts:

> I create my own notes by looking at different sources. And then I order notes. All my notes are ordered in accordance with either date or topic. I underline

> important parts, but I do it very carefully. I do not underline every line because it makes it harder for me to differentiate between the important parts and unimportant parts. [*Ben farklı kaynaklara bakarak kendi notlarımı çıkarırım. Sonra o notları sıralarım. Bütün notlarım tarih ya da konu sıralıdır. Önemli yerlerin altını çizerim ama bunu çok dikkatli yaparım. Her satırın altını çizmem çünkü o zaman neresi önemli neresi önemsiz anlamam zorlaşıyor.*] (Student 1)

Similarly, another student stated that first she makes a list of what she is going to study, then she organizes the topics by selecting one new the topic and one old the topic respectively. Thus, she studies a new the topic and then revises an old the topic. While doing this, she always uses multiple sources and underlines the important parts with colorful pencils. In addition, she has her own way of organizing sources. She uses sources with relatively easy questions first and then she continues with the sources with more difficult questions. She only feels that she has completed her task when she completes the things on her list. Till then she organizes her acts to keep studying. This shows us that these students deliberately and effectively use task strategies such as organizing sources, highlighting important parts and making a list of what to do to keep regulating their behaviors. They use a variety of strategies at the same time to efficiently organize their studies. Similarly, it is obvious that these strategies help them learn better and go into one step further towards goals and keep them regulated.

4.1.7. Help Seeking

Help seeking was one of the most emphasized results of the interviews with students. While only a few students (f=4) reported that they refer to their teachers when they have difficulty in understanding a particular subject or cannot solve a complex problem, the majority of the students (f=14) declared that they ask for their peers' help so as to solve a complex problem. Help seeking was a major result of the present study as students were quite comfortable with asking for help from their peers.

> My favorite style of studying is studying with my friends. When I study on my own, it is boring and I often feel helpless if I study alone. This is because whenever I cannot understand a topic or solve a problem, I get help from my friends. They are better than teachers because teachers are expert in the fields and they are not able explain things as simply as my friends. [*Benim en sevdiğim çalışma şekli arkadaşlarımla çalışma. Yalnız başıma çalıştığım zaman sıkıcı oluyor ya da kendimi çaresiz hissediyorum yalnız olunca. Çünkü bir yeri anlamadığımda ya da bir problemi çözemediğimde arkadaşlarımdan*

> *yardım alıyorum. Arkadaşlar öğretmenlerden daha iyi çünkü öğretmenler alanlarında uzmanlar ve arkadaşlarımız gibi basit açıklayamayabilirler*.] (Student 11)

Many other students also expressed that they believe asking questions to their peers is more efficient than asking the teachers as their friends can put things simpler. What is more, some students (*f*=2) revealed that there are students who are known to be good at certain courses and when their friends could not solve a problem or have hard times understanding a subject, they particularly ask these students. Thus, it was clearly emphasized that students often cooperate during their SRL process. This finding was also supported by teachers:

> The well-organized students are the ones who study with their peers. They have small groups and they study together. However, all members of the class affect one another in terms of their study habits. If one of them seriously studies and manages their time efficiently, the others usually follow this behavior. [*Düzenli öğrenciler arkadaşlarıyla çalışanlar. Küçük küçük grupları var onların ve beraber çalışırlar. Ama bütün sınıf bir birini etkiler çalışma konusunda. Eğer bir tanesi ciddi çalışıyorsa, zamanını ayarlıyorsa diğerleri de onun izinden gider genelde*.] (Teacher 14)

As mentioned above, students usually get help from each other when they cannot understand a subject or solve a complicated problem. However, the interview with the students also revealed that they often *benefit from technology* as well so as to learn new subjects. YouTube was the most frequently mentioned website by the students (*f*=12).

> I love learning the topics from YouTube videos. I developed this habit during the pandemic. YouTube is a great teacher. You can slow it down and it can repeat the topic as many time as you like. But to solve problems I talk to my friends. In our class certain people are good at certain school subjects. For example, they take the Math problems to me and we take Physics problems to … (the name of a classmate). We often study together and help each other. [*Ben konuları YouTube'dan öğrenmeyi seviyorum. Bu alışkanlığı pandemide geliştirdim. YouTube harika bir öğretmen bence. Yavaşlatabiliyorsun, hem de konuyu istediğin kadar tekrar edebiliyor. Ama problem çözmek için arkadaşlarımla konuşurum. Bizim sınıfta farklı kişiler farklı alanlarda iyiler. Örneğin, matematiği bana getirirler Fiziği ……'ya götürürüz. Genelde beraber çalışırız bir birimize yardım ederiz*.] (Student 14)

> I rarely ask my teacher when I cannot understand something or solve a question. First I revise my notes. Then I go online and do research on the topic.

> I watch YouTube videos. I particularly do that for Physics lesson. Then I ask my friends. Most of the time, I learn from my friends. Our friends can teach very well I think. [*Bir şeyi anlamazsam ya da bir soruyu çözemezsem ben nadiren öğretmenime danışırım. Önce notlarımı gözden geçiririm. Sonra internete bakarım, araştırma yaparum. YouTube videosu izlerim. Bunu genelde Fizik dersi için yaparım Sonra da arkadaşlarıma sorarım. Genelde arkadaşlarımdan öğrenirim. Bence arkadaşlarımız çok iyi öğretebiliyorlar*.] (Student 8)

Thus, it is true to state that students have specific habits of help-seeking. Because science high schools in Türkiye are boarding schools, the students have the opportunity to spend time together after the lessons. It is obvious that they either benefit from technology or learn from each other. This makes the learning process more interesting for them, which is likely to facilitate the self-regulation process.

4.1.8. Self-evaluation

Self-evaluation has been described as one of the important strategies. All the students (*f*=15) asserted that they evaluate their performance or learning process in various ways, and they adapt the strategies they employ accordingly. They mostly (*f*=13) reported that they evaluate their performance with the help of multiple choice questions that they answered related to a specific subject matter and checked the number of correct answers. Similarly, they make an evaluation of their learning process considering the extent to which they followed the schedule they created to organize their studies:

> I evaluate myself looking at the number of my correct answers. And then I check the topics of the questions that I gave incorrect answers to. Later, I plan myself accordingly and I revise those contents. *[Ben kendimi verdiğim doğru cevaplara bakarak değerlendiririm. Sonra da yanlış cevap verdiğim soruların konularına bakarım. Sonra kendimi ona göre planlarım, bu konuları tekrar ederim.]* (Student 13)

> I monitor myself while studying and whenever I feel that I difficulty in understanding a particular subject, I spend more time on it. *[Kendimi gözlemlerim ben çalışırken ve hani bir konuyu anlamakta zorlandığımı hissedersem ona daha çok zaman ayırırım.*] (Student 9)

> I do self-evaluation with the help of the multiple choice questions that I replied. For example, Geometry is my favorite school subject. I can see the connections immediately. However, “ratio and proportion” problems take some time to

> solve. I realized that I was not really good at this subject. Therefore, I used different sources to improve myself at this the topic. After I feel that I can solve problems well enough, I tell myself that OK, I have learned this subject. [*Ben öz-değerlendirmeyi çözdüğüm testler aracılığıyla yaparım. Örneğin, Geometri benim okuldaki favori dersim. Bağlantıları anında görebiliyorum. Ama mesela oran-orantı problemlerini çözmek zaman alıyor. Baktım bu konuda gerçekten iyi değilim. Bu yüzden farklı kaynaklar kullandım kendimi bu konuda geliştirebilmek için. Problemleri iyice çözebildiğimi hissettiğim zaman tamam derim kendime bu konuyu öğrendim.*] (Student 11)

Among the students who declared to use self-evaluation strategy, one of them presented a self-evaluation method that is quite developed:

> I usually color-code the content. For example, yellow means I need to revise it. Blue means it is completed. Green means I have completed studying the topic, but I need reinforcement, so I need to take some tests on that subject. And red means I have no idea about it. After I do this color coding activity, I reorganize my sources in accordance with the colors when I take a break. [*Genelde renklere göre kodlama yaparım. Mesela sarı demek tekrar gözden geçireceğim demek. Mavi demek tamamlandı demek. Yeşil demek konu tamamlandı ama biraz pekiştirmem gerek demek. O yüzden de test çözerim o konuda. Kırmızı demek o konuda hiçbir fikrim yok demek. Bu kodlama işini yaptıktan sonra ara verince tekrar bu renklere göre düzenlerim kaynaklarımı.*] (Student 15)

In addition, two students reported that they evaluate themselves by comparing their performance with other students:

> I evaluate myself by comparing myself with my friends. Not only in academic matters. I think I need to improve my communication skills and I am working on that. Also, I used to have difficulty in sitting on a chair for more than 1 hour. That used to be a big problem for me as exams are longer than that. I gradually solved this problem. First I tried to force myself to sit, but it did not work. Then I thought I needed a new strategy. Then I tried a new method. First I sat on the chair and wrote codes. I really enjoy doing this. Then I intermingled this process with studying and solved the problem. *[Ben kendimi arkadaşlarıma bakarak değerlendiririm. Sadece akademik konularda da değil. Bence iletişim becerilerimi de geliştirmem gerekiyor buna da çalışıyorum. Bir de ben sandalyede bir saatten fazla oturmakta zorlanıyordum. Bu benim için çok büyük bir problemdi çünkü sınavlar bundan çok daha uzun. Yavaş yavaş çözdüm bu problemi. İlk önce kendimi oturmaya zorladım ama olmadı. Sonra yeni bir taktiğe ihtiyacım olduğunu düşündüm. Sonra yeni bir method denedim: sandalyaye oturdum ve kod yazdım. Bunu yapmaktan cidden zevk alıyorum. Sonra bu sürece ders çalışmayı da kattım ve sorunu çözdüm.*] (Student 10)

All in all, so as to do self-evaluation, the students use some tools such as exams, different study sources or their friends. After they perform necessary tasks, they reflect

on their performances and determine the flaws in their performance or knowledge. Then they take necessary actions considering these evaluations.

4.2. Self-regulated Learning as a General or Domain Specific Concept

As stated in the previous chapter, the students employ distinctive tactics so as to excel in learning tasks. The present study also investigated if these tasks vary depending on the course. In other words, if the nature and type of these strategies differ across the subjects or they stay constant across the subjects. The results of the interview showed that the process of self-regulation is complex and it cannot be explained as domain specific or general in a simple way. To elaborate, the analysis of the results of the student interviews signaled that SRL strategies involve both *domain-specific and general features*. It has general processes that is valid across the subjects such as forethought, performance and self-reflection phases. Students (*f*=15) stated that they go through these phases in general. They set their goals, strategically plan how they are going to attain these goals, and arrange their environment to study and reflect on their performances, which helps them review their SRL process. Thus, it is possible to indicate that self-regulated students regulate their behavior to be successful in general. The students mentioned that while their studying habits stay constant, what they do while studying change depending on the nature of the course.

> I always create a schedule and organize my study place regardless of the course that I will study. However, my methods are different for every school subject. For Physics, for instance, I do my best to keep question styles in mind. I focus on the types of questions and I develop a method for each question type. For biology and Chemistry, I do constant revision. I think about the subjects deeply. I revise many examples to comprehend the topic. For Math, I just solve problems. [*Çalışacağım dersten bağımsız olarak hep bir takvim oluşturur ve çalışma ortamımı düzenlerim. Fakat çalışma yöntemim her deste farklıdır. Atıyorum fizik dersinde soru tiplerini aklımda tutmaya çalışırım. Soru tipine odaklanır ve hepsi için bir çözüm yöntemi geliştiririm. Biyoloji ve kimya için düzenli tekrar yaparım. Konuları derinlemesine düşünürüm. Bir çok örnek üzerinden konuyu kavramaya çalışırım. Matematik dersi içinse sadece soru çözerim.*] (Student 14)

> My study habits do not change from one course to another. The things that I do while studying change. I mean I do things differently depending on the course. For courses which are more about reading and memorizing, I take notes of key words and I study on my own. For the other courses such as Math or Natural

> Sciences, I like studying with my friends. We answer multiple choice questions together. That really helps. [*Benim çalışma alışkanlıklarım dersten derse göre değişmez. Çalışırken yaptıklarım değişir. Yani derse göre farklı şeyler yaparım. Mesela okuma ve ezbere yönelik derslerde küçük notlar alır ve kendim çalışırım. Matematik ve fen desrlerineyse arkadaşlarımla çalışmayı severim. Çoktan seçmeli soruları birlikte çözeriz ve bu da epey yardımcı olur.*] (Student 2)

> I can say that my learning styles both change and do not change depending on the course. I mean, I take notes in all classes and I order them in accordance with their dates. I do this for all classes. But also my learning style changes because for classes like History or Geography or Turkish, I read the class content repeatedly. I sometimes record my voice on my phone and I listen to my recordings. For Math and Natural Sciences, I answer a lot of multiple choice questions. [*Öğrenme tarzım dersten derse göre hem değişir hem değişmez. Yani bütün derslerde notlar alırım ve bunları tarih sırasına koyarım. Bunu tüm derslerde yaparım. Fakat öğrenme tarzım tarih, coğrafya ve türkçe derslerinde farklıdır. Ders notlarını sürekli tekrar ederim. Bazen telefonumla sesimi kaydeder ve tekrar dinlerim. Matematik ve fen dersleri için çok fazla çoktan seçmeli soru çözerim.*] (Student 6)

As seen in the quotes students go through the similar stages of forethought and self reflection regardless of the course. However, what they do in the performance phase differ depending on the course. They justify it by emphasizing the idea that the nature of the course requires them to employ different strategies.

Similarly, the self-efficacy beliefs have been reported to be a *domain-specific area* of self-regulation. To elaborate, students' self-efficacy beliefs and the level of self-regulation they perform in relation to these self-efficacy beliefs change depending on the field of study:

> The task strategies that I use vary depending on the course. I learn Math subjects during the lesson. I do not do much about them after the lessons. I just solve some Math problems. I trust myself when it comes to Math. However, I think biology requires a bit more about memorizing. I do not do logical reasoning for such courses as much as I do for Math. Therefore, I summarize the topics and then I solve some multiple choice questions. I generally need to study more for Biology. [*Benim kullandığım stratejiler dersten derse farklılık gösteriyor. Matematik konularını derste öğrenirim. Dersten sonra çok bir şey yapmama gerek kalmaz. Sadece soru çözerim. Matematikte kendime güvenirim. Ama biyoloji daha bir ezber gerektiriyor. Bu tarz derslerde Matematikteki gibi mantıkla bağlantı kurup yapamıyorsunuz. Bu yüzden de işte konuları özetliyorum sonra da soru çözüyorum. Biyolojiye daha çok çalışmam gerekiyor genelde.*] (Student 4)

> I love Math and Biology. I also love studying Chemistry. I am successful in these courses. However, I do not really like Physics. Usually, I do not feel like studying Physics. I force myself to learn or at least memorize. [*Matematik ve biyolojiyi severim. Kimya çalışmayı da seviyorum. Bu derslerde başarılıyımdır. Fakat fiziği pek sevdiğim söylenemez. Fizik dersine çalışmaktan da pek hoşlanmam. Kendimi öğrenmeye veya en azından ezberlemeye zorlarım. Dolayısıyla diğer dersleri anlamaya çaba sarfederken, fizik dersindeki konuları ezberlerim.*] (Student 1)

> I am good at Math, so it is easier for me. On the other hand, for school subjects like Biology or Chemistry, I need to do revision on a regular basis, so I read my notes and then I solve some problems. [*Matematikte iyi olduğumdan bana daha kolay gelir. Fakat biyoloji ve kimya gibi derslerde düzenli tekrara ihtiyaç duyarım. Bundan dolayı önce notlarımı okur sonra problemleri çözerim.*] (Student 15)

> My favorite courses are Math and Natural Sciences such as Physics, Biology and Chemistry. I feel more confident about these courses. I do not have to do lots of extra things to comprehend the topics. I can easily go step further than the others. I do not like doing revision, so Math is the ideal course for me. I solve a lot of Math problems, so I excel in Math. But for other classes such as Biology, I have to review the topics all the time. It is a bit more challenging for me, but I can still handle it. I read my notes for such classes and then I answer multiple choice questions. I am getting better day by day I feel it. *[En sevdiğim dersler matematik ve fen bilimleridir. İşte fizik, kimya ve biyoloji gibi. Bu derslerde kendime daha çok güvenirim. Konuları kavramak için ekstra çalışmama gerek olmaz. Kolaylıkla diğerlerinin önüne geçebilirim. Tekrar yapmayı sevmediğim için matematik benim için en öndedir. Çok fazla matematik sorusu çözerim. Bu yüzden matematiğim çok iyidir. Biyoloji gibi diğer derslerde konuları sürekli tekrar etmem gerekir. Benim içind aha zor olsa da bir şekilde hallederim. Bu derslerdeki tuttuğum notları okurum ve sonra test çözerim. Güç geçtikçe de daha iyi olduğumu hissediyorum*] (Student 10)

As the analysis of the interviews with the students revealed, the SRL process has both general and domain specific aspects. The analysis indicated that all the students acknowledged the cycle of self-regulation and the stages of forethought, performance and self-reflection which feed and reshape each other. However, when we go into the details of the self-regulation process, we can observe that certain elements of SRL such as self-efficacy beliefs, task interest, the task strategies employed by the students to accomplish a goal and self-satisfaction vary depending on the course. To illustrate, the majority of the students (*f*=13) stated that they have a particular interest in Math. Therefore, they show more enthusiasm for Math problems. They also have higher self-efficacy beliefs when it comes to this particular field of study. They think they have

the capability to solve a range of Math problems, and feel more satisfied when they do so. Besides, the majority of the students (*f*=13) articulated that there is a clear difference between the strategies they employ while studying Math and other courses. They are keen on solving Math problems and focus on seeing a variety of Math questions. On the other hand, for other courses, they revise their notes, try to simplify the content to comprehend better and highlight key points. In addition, some students (*f*=5) expressed that they have lower self-efficacy when it comes to Physics class. Although they regulate their behavior and keep studying to execute tasks related to this course, they stated that they are less interested in this course and feel less self-satisfaction for this course.

All in all, in line with the results presented above, it is appropriate to conclude that self-regulated learning is a convoluted process bringing both general and domain specific aspects together.

4.3. Beliefs of Teachers on Self-regulated Learning

In this part of the relevant study, the beliefs of teachers working at the top ranking science high schools of Türkiye on SRL are shared based on the analysis of the data collected via the Self-Regulated Learning Teacher Belief Scale (SRLTB) and the interviews conducted with the teachers. Table 11 shows mean and standard deviation values for the SRLTB in descending order. Their mean values ranged between 2.70 and 3.59, indicating a relatively supporting belief of teachers in SRL.

Table 11

Beliefs of Teachers on Self-Regulated Learning

	M	***SD***
Self-regulated learning makes pupils evaluate their learning approach better.	3.59	0.56
A self-regulated environment makes it easier to take into account pupils' experiences and interests.	3.46	0.53

	M	*SD*
Each pupil should be given the opportunity to regulate their own learning.	3.4	0.77
Self-regulated learning provides pupils with a more thorough preparation for their transition to university education.	3.27	0.84
Self-regulated learning leads to a more efficient collaboration between pupils.	3.23	0.77
Self-regulated learning is practicable in high school education.	3.18	0.87
Pupils should be able to make decisions about the sequence and duration of their learning activities more often.	3.16	0.99
Pupils have the capacity to determine what they want to learn.	3.06	0.87
Pupils should be able to decide when they work on an assignment more often	2.87	1.03
Pupils have the required self-discipline to take responsibility for their learning in high school.	2.7	0.95

The results of the analysis of the interviews conducted with the teachers indicated parallel results. The following quotes illustrate this notion:

> I believe self-regulation is the foundation stone of success both in academic life and in social life. In my opinion, the most successful people are the ones who have great self-regulation skills. For example, Mustafa Kemal Atatürk was a highly self-regulated person. We know that he spared time to read even during the wars. He managed to achieve thousands of things because he effectively managed his time. [*Akademik ve sosyal hayatta başarının yapı taşının öz düzenleme olduğuna inanırım. Bana göre en başarılı insanlar en iyi öz düzenleme yetileri olanlardır. Mesela Mustafa Kemal Atatürk çok iyi öz düzenlemeye sahipti. Savaşlarda bile kitap okumaya zaman ayırdığını biliyoruz. Zamanının çok iyi yönettiği için çok fazla başarıya ulaştı.*] (Teacher 12)

> I believe self-regulation involves controlling one's emotions, ideas, and acts and managing them effectively to reach a goal. In simple terms, it also means high awareness of one's behavior and using this awareness to attain a goal. It is a skill, I think. This skill helps people to make their own decisions and to shape their lives regarding these decisions. A student with good self-regulated

> learning skills is able to organize their life around the goals s/he set and have a certain level of discipline. S/he is a dedicated student, I believe. These types of students do not easily give up. They develop resistance against the difficulties s/he encounters. They carry on studying maintaining a certain level of discipline. [*Öz düzenlemenin kişinin duygularını düşüncelerini davranışlarını ve bunları bir hedef doğrultusunda yönetebilmesini sağladığına inanıyorum. Basitçe kişinin davranışlarının farkındalığı ve bu farkındalığı bir amaç uğruna kullanması anlamına gelir. Bence bu bir yetenek. Bu yetenek insanların kendi kararlarını verebilmesine ve hayatlarını düşünceleri doğrultusunda şekillendirebilmesine yardımcı olur. İyi öz düzenleme öğrenme yetisine sahip bir öğrenci hayatını hedefleri ve belirli bir disiplin seviyesinde organize edebilir. Adanmış bir öğrenci olduğuna inanırım. Bu tarz öğrenciler kolaylıkla vazgeçmezler. Karşılaştıkları zorluklara karşı direnç gösterirler. Belirli bir disiplini koruyarak çalışmaya devam ederler*.] (Teacher 8)

> Self-regulation is all about auto-control I think. If a student can control himself/herself to achieve a goal, then that student is self-regulated. I believe a self-regulated student can manage both their academic studies and social life. [*Öz düzenleme bence tamamen otokontrolle ilgili. Bir öğrenci kendini bir amaç doğrultusunda kontrol edebiliyorsa öz düzenlidir. Öz düzenli bir öğrenci akademik ve sosyal hayatını yönetebilir*.] (Teacher 7)

> Being self-regulated is about having a plan I think. It is also about being aware of your responsibilities and organizing your life around these responsibilities. It also involves prioritizing some tasks above the others considering their importance. [*Bana göre öz düzenleme bir planının olmasıyla alakalı. Aynı zamanda sorumluluklarının ve sorumluluklarının etrafında hayatını organize edebilmekle alakalı. Bazı şeyleri önem sırasında göre diğerlerine göre önceliklendirmeyi içerir*.] (Teacher 2)

As seen in the results of the interviews with the teachers, the beliefs of teachers regarding self-regulation are centered mostly on self-control, planning, and developing awareness of the responsibilities that one has. All the teachers (*f*=15) also signaled a clear link between self-regulation and academic success. They underlined the importance of self-regulation in order to attain certain goals.

When it comes to evaluating their students' self-regulated learning skills, the majority of teachers (*f*=13) stated that their students employ a variety of self-regulated learning skills, and they are distinctively self-regulated compared with the students of other schools that they worked at earlier. They indicated that their students have developed a range of self-regulation skills already, and all they have to do is to help them maintain those skills. That is the point at which they are the most active. They also underscored that their students do not only plan their studies with the help of self-regulated learning.

They also plan their social life and create a balance between academic studies and social life by managing their time effectively.

> The students in the science high schools are always ready to learn. They do the tasks that we assign them. If they cannot accomplish a certain task in the given time, they feel embarrassed because of that. I can say that my students are always aware of their responsibilities. Regulating their lives is their style, I suppose. [*Fen lisesindeki öğrenciler öğrenmeye her zaman hazırdır. Onlara verdiğimiz ödevleri yaparlar. Eğer ödevleri verdiğimiz sürede tamamlayamazlarsa bundan dolayı mahçup olurlar. Öğrencilerimin her zaman sorumluluklarının farkında olduğunu söyleyebilirim. Hayatlarını düzenlemek onların stili sanki*.] (Teacher 9)

> My students are very motivated. They have great self-regulated learning skills. They have a great academic curiosity. They ask great questions. In Biology class, we learn about a range of plants and animals and they love doing research on them. They always keep learning after class. I plan my life to learn new things every day because they come up with very interesting questions. At the end, they become very successful, most of them end up becoming great doctors. *[İki farklı öz düzenleme seviyesine sahip öğrencilere sahip olduğumu düşünüyorum. İki uç nokta olduğunu söyleyebilirim. Önceki okulumda öğrencilerin akademik başarı hedefleri ve öz düzenleme yetileri yoktu. Daha doğru düzgün yazamayan öğrencilere biyoloji öğretmeye çalışıyordum. Fakat buradaki öğrencilerim çok motive. Çok iyi bir öz düzenleme yetileri var. Çok fazla akademik merakları var. Harika sorular soruyorlar. Biyoloji dersinde bir sürü bitki ve hayvan öğreniyoruz ve onları araştırmayı çok seviyorlar. Dersten sonra da öğrenmeye devam ediyorlar. Her gün yeni şeyler öğrenmek üzere çalışıyorum çünkü çok yaratıcı sorularla geliyorlar. Sonunda çok başarılı oluyorlar. Genellikle çoğu sonunda çok iyi doktor oluyor*.] (Teacher 4)

> I can say that my students are self-regulated and they do it not just for academic success. They plan and organize their lives in order to do effective multitasking. They are interested in a variety of extracurricular activities too. Sometimes, they tell me about the sports they do and I feel really surprised. They know the things that I have never heard before. This is what makes these students successful. They, I mean 60 or 70 % of my students, have a variety of hobbies and in order to be successful in different areas of life, they control themselves and they manage their schedules. [*Öğrencilerimin öz düzenlemeye sahip olduklarını ve bunu sadece akademik başarı için yapmadıklarını söyleyebilirim. Hayatlarını çoklu görevleri yerine getirebilmek için çok iyi planlıyorlar. Müfredat dışı bir sürü konuyla da ilgileniyorlar. Bazen uğraştıkları sporlardan bahsediyorlar, ben gerçekten şaşırıyorum. Benim daha önce hiç duymadığım şeyleri biliyorlar. Öğrencileri başarılı yapan da budur. Öğrencilerimin yani %60 veya %70'i çeşitli hobilere sahipler. Hayatın çeşitli alanlarında başarılı olabilmek için kendilerini kontrol ederek zamanlarını planlıyorlar.*] (Teacher 13)

> These kids know how to be disciplined and they maintain this discipline. They play an instrument or they read a variety of different books. They have knowledge about the topics that you cannot even imagine. They use their time productively. They have great auto control. Most of them are interested in learning foreign languages, too. They are not doing their homework just for the sake of doing it. They do their homework so as to learn. They usually excel in Math, but it is not their only skill. [*Çocuklar nasıl disiplinli olmaları gerektiğini biliyor ve bu disiplini koruyorlar. Entrüman çalıyorlar veya çeşitli bir sürü kitap okuyorlar. Sizin hayal bile edemeyeceğiniz konular hakkında bilgi sahibiler. Zamanlarını üretken geçiriyorlar. Çok iyi otokontrolleri var. Çoğunluğu yabancı dil öğrenmeye de ilgili. Ödevleri yapmış olmak için değil öğrenmek için yapıyorlar. Genelllikle matematikte çok iyiler fakat bu onların tek yeteneği değil.*] (Teacher 5)

In addition, when the teachers were asked whether SRL skills of their present students that is the students in science high school they work differ from the other students they taught earlier, they all underlined that the students in science high schools are certainly different in terms of SRL skills. This was one of the indicators that teachers working at science high schools have a high awareness of SRL.

> There is a great difference between the students in my previous workplace and the students that I have now in science high school. Here all the students have goals. They study hard in order to achieve these goals. They like doing research. They are able to take different approaches to the topics. Sometimes I feel amazed at the questions that my students ask. Because they plan their life effectively, they are able to become academically successful and possess a great deal of general world knowledge at the same time. [*Daha önceki çalıştığım okuldaki öğrencilerle şu an çalıştığım fen lisesindeki öğrenciler arasında çok büyük fark var. Burada tüm öğrencilerin hedefleri var. Bu hedeflere ulaşabilmek için çok fazla çalışıyorlar. Araştırma yapmayı seviyorlar. Konulara farklı yaklaşımlar getirmeyi seviyorlar. Bazen öğrencilerimin sorularına çok şaşırıyorum. Hayatlarını etkili bir şekilde planlayabildiklerinden akademik olarak başarılı oluyor ve iyi bir genel dünya görüşüne sahip oluyorlar.*] (Teacher 14)

> The students that I had in other schools were dependent on the teachers while the students that I have now are more independent. They know how to access knowledge. They use technology so as to reach correct information. They have a certain level of self-discipline and they always have a goal in their minds. They organize everything around these goals. [*Daha önceki okullarımdaki öğrenciler öğretmenlerine bağımlıydı fakat buradaki öğrenciler daha bağımsız. Bilgiye nasıl ulaşabileceklerini biliyorlar. Doğru bilgiye ulaşabilmek için teknolojiden faydalanıyorlar. Belirli bir seviyede öz disiplinleri ve kafalarında hep bir hedefleri var. Her şeyi bu hedefleri doğrultusunda organize ediyorlar.*] (Teacher 1)

Some of the teachers (*f*=4) also expressed that these students have a high level of SRL skills because they were allowed to make their own choices. To elaborate, they were not forced to make certain choices that their families or teachers imposed on them. They created their own path and so followed this path willingly as that was their choice. It was stated by the teachers that while the students who were strictly controlled by their parents or teachers have adaptation problems in science high schools, the students who have developed a kind of self-control system make a smooth transition to science high school and keep studying regularly and managing their time effectively. However, there are also some students who have been externally regulated. Item in SRLTB, which was endorsed the lowest (M = 2.7), was "Pupils have the required self-discipline to take responsibility for their learning in high school." The students who were said to be externally regulated by their parents or teachers explain this result stating that these students lack self-discipline. Although they have a certain level of discipline, their source is not internal but external, which is not compatible with the idea of self-regulation. On the other hand, it was also stressed during the interviews that the number of students that were controlled by their parents or teachers is low in science high schools, while the number of students who have learned to regulate their own behavior is much higher. Besides, a couple of teachers (*f*=3) mentioned that female students tend to be more self-regulated than male ones.

> We have students who are really well-organized and disciplined. Female students are better than male students in terms of organizational skills. They make their own plans and they follow such plans. This self-control is a part of their personality, I think. They have a mechanism of self-control. They fulfill their responsibilities and we do not have to tell them to do so. Sometimes, boys spend too much time with online games, but girls do not do that. But in general they all have a certain level of internal control mechanism. [*Düzenli ve disiplinli öğrencilerimiz var. Düzen anlamında kız öğrencilerimiz erkek öğrencilerimizden daha iyi. Kendi planlarını yapıp bu planlara uyuyorlar. Bana göre öz kontrolleri kişiliklerinin bir parçası. Öz kontrol mekanizmaları var. Sorumluluklarını yerine getiriyorlar ve bizim onlara yapmaları gerektiğini söylememize gerek kalmıyor. Bazen erkek öğrenciler bilgisayar oyunlarıyla çok fazla vakit geçiriyor fakat kızlarda bu yok. Fakat genel olarak tüm öğrencilerde belirli bir iç kontrol mekanizması var.*] (Teacher 13)

Thus, in general, teachers disclosed favorable attitudes towards self-regulated learning and indicated that their students perform self-regulation in different areas of their lives.

On the other hand, some teachers (*f*=6) signified a decline in the SRL skills of their students. First, they expressed that the COVID19 pandemic posed a *threat to SRL* skills of their students because there is an increase in the use of technology by their students. Technology had a negative impact on their students' SRL skills as their students spend much time with technology, their collaborative learning activities have declined and some of them have a hard time managing the time they spend with technology and so have less time to do other tasks.

> The COVID19 pandemic has a negative impact on the self-discipline of our students. They are more addicted to technology now and they have fewer social skills. This is especially true for 9th and 10th grade students. They read fewer books and spend more time with technology. [*Pandemi, öğrencilerimizin öz disiplinleri üzerinde olumsuz etki yarattı. Artık daha fazla teknoloji bağımlıları oldular ve daha az sosyal yetenekleri var. Bu özellikle 9. ve 10. Sınıf öğrencileri için geçerli. Daha az kitap okuyorlar ve teknolojiye daha fazla zaman ayırıyorlar.*] (Teacher 6)

> I think there is a decline in students' academic skills and their self-discipline after the pandemic. Now we are trying to guide them to spend less time with technology and more time with books. [*Bence öğrencilerin akademik yeteneklerinde ve öz disiplinlerinde bir düşüş oldu pandemiden sonra. Şu anda onları kitaplarla daha fazla zaman geçirmeleri ve teknolojiye daha az zaman ayırlmaları konusunda yönlendirmeye çalışıyoruz.*] (Teacher 11)

In conclusion, as indicated in the analysis of the interviews with the teachers and the Self-Regulated Learning Teacher Belief Scale, the teachers advocate self-regulated learning and believe that the students who can plan their life and take control of their acts and emotions are able to effectively manage both their academic and social lives. This leads to success and enables the students to spend time fruitfully.It has also been revealed that the students who have developed a certain level of self-discipline easily adapt into science high schools and learn better compared to those who have been controlled by a parent or teacher. These students develop higher self-efficacy too. Finally, the adverse influence of the COVID19 pandemic has been put forward by the teachers due to the increase in the time that the students spend with technology. The pandemic has been reported to have a negative impact on the self-regulated learning process of the students, as they got used to spending more time with technology and had less chance to have collaborative learning activities, which is a key element in the self-regulated learning process.

4.4. The Instruction Related Factors Promoting the SRL Strategies of Students

One of the aims of this study was to uncover the instructional factors that promote the development of self-regulated learning strategies. In order to reveal these factors, interviews with the teachers and students of the top ranking science high schools of Türkiye were conducted. In this part of the present study, the analysis of these interviews uncovering the instructional factors promoting the SRL Strategies of Students is reported.

4.4.1. The Role of the Primary School Teacher

In the interviews, the students were asked to explain the elements of instruction which helped them to develop their strategies. They were asked to consider the instruction they have received since the beginning of their education. The analysis of the interviews conducted with the students revealed some influential factors affecting the development of SRL strategies. However, there was one instruction related factor that the majority of the students strongly emphasized which is the role of the primary school teachers. The majority of the students (*f*=13) stressed that their primary school teacher had a great impact on them and s/he helped to develop SRL strategies. The primary school teachers were reported to contribute into the SRL development of their students by teaching them SRL skills, building rapport with their students, arousing academic interest in students, keeping a record of students' learning

4.4.1.1.Teaching SRL skills

Many students (*f*=8) reported that their primary school teacher taught them important SRL skills like managing time via to-do lists and encouraged them to study regularly:

> My primary school teacher has had a huge impact on me. Even when I was at the first grade, my teacher was giving a lot of homework. I was too little to complete that much of homework on time. For this reason, I developed strategies and coping mechanisms. My primary school teacher taught me to create study schedules. Then I started to organize my life around my studies. I can say that I have been studying regularly since the 2nd grade. [*İlkokul öğretmenimin üzerimde çok büyük etkisi olmuştur. Birinci sınıftayken bile bir sürü ödev verirdi. Bu kadar ödevi zamanında bitirebilmek için çok küçüktüm. Bu nedenle stratejiler ve baş etme mekanizmaları geliştirdim. İlkokul öğretmenim bana çalışma programı yapmayı öğretti. Sonrasında hayatımı*

> *çalışmalarımın etrafında organize etmeye, düzenlemeye başladım. İkinci sınıftan itibaren düzenli çalıştığımı söyleyebilirim.*] (Student 7)

Primary school teachers were also reported to teach task strategies such as notetaking:

> My primary school teacher taught me a lot of study skills. I learned how to take notes from him. I actually learned how to learn. [*İlkokul öğretmenim bir sürü çalışma yöntemi öğretti. Nasıl not alınması gerektiğini ondan öğrendim. Nasıl öğrenmek gerektiğini de.]* (Student 3)

Keeping a record of students' learning was reported to be an influential factor to promote SRL by several student participants of the study (*f*=5). The students stated that because their teacher kept a record of their progress, they started to be more and more aware of their learning process. This helped them develop SRL skills in a couple of ways. First, they gained awareness on the subjects that they did not really comprehend and started to study on them after school with the guidance of their teachers. Thus, gradually they developed self-regulation skills. Second, they took their teacher's method as a model and they started to keep track of their own learning. This aided them to develop self-evaluation skills which is an important SRL skill.

> I owe all my effective study habits to my primary school teacher. He was a dedicated teacher. He gave homework and checked our homework carefully. He kept a record of our progress. Thanks to him, I have developed regular study habits and I have been studying regularly since primary school. [*Tüm verimli çalışma alışlanlıklarımı ilkokul öğretmenime borçluyum. İdealist bir öğretmendi. Ödev verirdi ve dikkatli bir şekilde kontrol ederdi. Gelişimimizin kaydını tutardı. Onun sayesinde düzenli çalışma alışkanlığı edindim ve ilkokuldan beri düzenli çalışıyorum*.] (Student 5)

> Our primary school teacher had a system of her own. She never left things to chance. She always checked our progress and informed us about our progress. She was really hardworking. I think this made me hardworking, too. Today, I also take regular notes of the things I did, and the things I comprehended and I did not comprehend. [*Bizim ilkokul öğretmenimizin kendine göre bir sistemi vardı. Hiç bir şeyi şansa bırakmazdı. Gelişimimizi sürekli takip eder ve bizi gelişimimizle ilgili bilgilendirirdi. Çok çalışkandı. Bence beni de çok çalışkan yaptı. Şimdi mesela ben de artık neler yaptım neleri anladım neleri anlamadım bunun notlarını düzenli olarak tutuyorum.*] (Student 8)

Thus, it is appropriate to conclude that self-regulated students started to learn self-regulation strategies at an early age. Strategy training of these primary school teachers lead to the development of more and more SRL skills in these students. The students

particularly emphasized that they learned how to learn from their primary school teachers which triggered their SRL process.

4.4.1.2.Building Rapport with Students

Some participants (*f*=6) of the study also stated that their primary school teacher had a good relationship with them which contributed to their SRL process. Because they like their primary school teacher, they paid more attention to their words and did not give up on doing homework. They also followed their instructions to study after school. Thus, they gradually became more and more self-regulated learners.

> The students in other classes were unhappy about their teachers and they were afraid of them. I and my classmates, we loved our teacher. He approached us with affection. I was studying to make him happy. I became more organized and hardworking in order not to disappoint him. He is the one who made the person that I became today. *Diğer sınıftaki öğrenciler öğretmenlerinden ve ondan korktukları için mutsuzlardı. Ben ve sınıf arkadaşlarım öğretmenimizi çok severdik. Bize sevgiyle yaklaşırdı. Onu mutlu etmek için dersime çalışırdım. Onu hayalkırıklığına uğratmamak için daha düzenli çalışkan oldum. Bugün olduğum kişi olmamı sağlayan kişidir kendisi.*] (Student 3)

Although building rapport with students was not the only factor this was a contributing factor which became more meaningful when it is combined with other practices of the teacher such as rewarding hardworking students.

> My primary school teacher had his own system of rewarding students. He took the students who had got high grades to sightseeing. I really enjoyed such sightseeing tours and I studied hard to go with my teacher. I always wanted to be appreciated by him, so I put a lot of effort in my studies. Then I became a disciplined person, too. [*Çok disiplinli bir ilkokul öğretmenim vardı. Öğrencileri ödüllendirdiği bir sistemi vardı. Yüksek notlar alan öğrencilerini gezmeye götürürdü. Gezileri çok sevdiğimden gezilere katılabilmek için derslerime çok çalışırdım. Hep onun tarafından takdir edilmek isterdim. Bu nedenle derslerime çok fazla çalışırdım. Sonrasında disiplinli bir insan da oldum*.] (Student 1)

4.4.1.3.Generating academic interest in students

Generating academic interest among students was reported to be an influential factor by the participants (*f*=6). They stated that because their primary school teacher made

the lessons interesting for them, they became more and more interested in academic studies and continue studying after the lessons which facilitated the SRL process:

> My primary school teacher has impacted me a lot. We used to play a lot of games once we were in primary school. These games were connected with Math. It was great really. Also, she was creating stories and she was using these stories to teach us the subjects. I think this method was very useful… I started to like Math and other lessons thanks to her. I was studying after school, but it was like a game to me.[*İlkokul öğretmenimin üzerindeki çok emeği var. İlkokuldayken çok fazla oyun oynardık. Bu oyunlar matematikle bağlantılıydı. Gerçekten harikaydı. Ayrıca hikayeler uydurur ve bu hikayeleri bize bir şeyler öğretmenk için kullanırdı. Bu yöntemin çok faydalı olduğunu düşünüyorum. .. Matematiği de diğer dersleri de onun sayesinde sevmeye başladım. Okuldan sonra çalışıyordum ama bana oyun gibi geliyordu.]*(Student 6)

> My primary school teacher was wonderful. She was teaching Math via theatre plays. We read stories. Lessons were not in the form of lessons. They were not boring. We were not just listening, we were also active participants of the lessons. We were always reading something at the beginning of the lessons. Thanks to her, I became interested in academic subjects… I carried on learning like that. Studying regularly was a difficult job for me.[*İlkokul öğretmenim harika biriydi. Matematiği tiyatro oyunlarıyla öğretirdi. Hikayeler okurduk. Dersler ders gibi değildi. Sıkıcı değildi. Dersi sadece dersi dinlemiyor aktif olarak da katılıyorduk. Dersin başında hep bir şeyler okurduk. Onun sayesinde akademik konulara ilgili oldum. Bu şekilde de öğrenmeye devam ettim. Düzenli çalışmak zor gelmedi.*] (Student 15)

As seen in the analysis of the student interviews, the students reported being greatly impacted by their primary school teacher. Based on the results of the present study, it is possible to state that behind highly self-regulated students there are dedicated primary school teachers who study hard to keep their students active and help them to learn better. The majority of the students (*f*=13) clearly expressed that the different methods that their teachers employed such as storytelling, creating games or rewarding students in various ways generated interested among students in academic subjects. Thanks to these teachers and their methods, they developed or learned study habits and they have maintained these acts of regulation.

4.4.2. The Role of the Middle School Teacher

In addition to primary school teachers, some students (*f*=5) mentioned the impact of middle school teachers on their SRL process. Because students take an exam at the

end of the middle school, it is important for them to study regularly and organize their lives around their studies so that they can be accepted into a top ranking high school in Türkiye. For this reason, middle school teachers also play an important role in their students' lives.

4.4.2.1.Generating academic interest in students

Analysis of the student interviews showed that middle school teachers also facilitated their students' SRL process. Generating academic interest among students is one of the things that middle school teachers did which was reported to have promoted SRL by the students (*f*=5).

> I had a Math teacher in middle school. Thanks to him, I realized that learning something new can be fun too. He was creating games using the content of the class. I particularly liked his course and so I started to study more. Thanks to him, gradually I became a student who studies regularly. [*Benim ortaokulda bir matematik öğretmenim vardı. Onun sayesinde yeni bir şey öğrenmenin keyifli bir şey olabileceğini anladım. Dersin içeriğini kullanarak oyunlar yaratırdı. Onun dersini çok sevdim o yüzden de daha çok çalışmaya başldım. Onun sayesinde zamanla düzenli çalışan bir öğrenci oldum*.] (Student 7)

4.4.2.2.Teaching SRL skills

The students also reported tht middle school teachers taught some certain SRL skills (*f*=2). These skills include notetaking and revising notes:

> I have some teachers who influenced me a lot in middle school. My teacher of Turkish taught me how to take notes. She taught me how to break long content into small pieces in such notes. I started to study in a different way. I stopped memorizing things. I started to analyze language like roots or suffixes. She told me to regularly revise these notes after school. I did that. Then step by step I started to comprehend topics better and I developed a habit of that. [*Ortaokuldayken beni çok etkileyen öğretmenlerim oldu. Türkçe öğretmenim not almayı öğretti. Uzun konuları daha küçük parçalara bölmeyi öğretti not alırken. Sonra ben farklı şekilde çalışmaya başladım ezberlemeyi bıraktım. Dili ekine köküne ayırmaya başladım. Notlarımı okkuldan sonra tekrar etmemi söylemişti öyle yaptım. Sonra adım adım daha iyi anlamaya başladım konuları. O şekilde düzenli çalışmak da alışkanlık oldu*.] (Student 8)

> I had a Math teacher in middle school. He had his own methods and he was a wonderful teacher. For example, at the end of each day we were writing the math problems that we could not solve or made mistakes while solving. Then we were solving the problems again on a separate piece of paper at home. He

> wanted to make sure that we comprehended the topic. I think he had a great impact on me. When I realized that I could do Math, I started to study more. [*Ortaokuldayken bir Matematik öğretmenim vardı benim. Kendi yöntemleri vardı, harika bir öğretmendi. Örneğin; her günün sonunda çözemediğimiz ya da çözerken hata yaptığımız soruları yazardık. Sonra evde onları ayrı bir kağıt üzerinde çözerdik. Konuyu anladığımızdan emin olmak isterdi hep. Bence benim üzerimde çok etkisi oldu. Matematiği yapabildiğimi fark edince daha da çalıştım*.] (Student 1)

Thus, it can also be stated that these teachers taught their students SRL strategies as well as some task strategies. This both helped them become more self-regulated and increases their self-efficacy beliefs which also fed self-regulation process.

4.4.2.3.Building Rapport with Students

The good relationship between the middle school teachers and students was reported to have a positive impact on SRL by the students (*f*=2).

> My middle school Math teacher was very friendly. He was trying to communicate with each and every student in class while teaching. Normally, teachers have some favorites and they usually communicate with those while teaching. He was not like that. He was fair. He liked his students. Because I liked him very much, I wanted to make him proud and did give up on studying. [*Ortaokul Matematik öğremenim çok cana yakındı. Derste hepimizde iletişim kurmaya çalışırdı. Normalde öğretmenlerin birkaç gözdesi olur hep onlarla ders işlemeye çalışır ya öyle değildi. Adildi. Öğrencileri severd. Onu çok sevdiğim için onu gurulandırmak istedim. Bu yüzden bırakmadım çalışmayı.*]

Thus, it is possible to set forth the conclusion that while primary school teachers have been reported to have a tremendous effect on the SRL process of the students, middle school teachers have been also notified to have promoted the SRL development, particularly with the methods they utilized such as teaching task skills and arousing academic interest and building a good relationship with their students. They were noted to be an important contributing factor which encouraged students to keep self-regulating.

4.4.3. The Role of the Science High School Teacher

When it comes to the effect of science high school teachers on the SRL development of the students, the analysis of the student interviews showed that they have a substantial impact on the SRL strategies of the students. A considerable number of the

students (*f*=11) underlined that the teachers at that their school help them stay regulated. As science high schools are also boarding schools, there is a considerable number of students who stay in the dormitories. Their teachers also stay with them by taking turns. This gives teachers a better chance to observe their students after school as well. Thus, they can guide their students if need be. Furthermore, the students get the chance to seek help from their teachers after school as well. Therefore, we can state that science high school teachers contribute to the SRL process of their students in a variety of ways. This finding was stressed by both teachers and students.

4.4.3.1.Teaching SRL skills

During the interviews, both students and teachers underlined that teachers show efforts to teach SRL skills to the students and keep them regulated. Teachers aim to achieve this in a variety of ways. The first thing that many teachers emphasized is *teaching time management skills* to the students. Teachers stated that so as to coach the SRL process of their students is to teach them time management skills. Some of the teachers (*f*=7) stated that they observe their students closely and if they feel the need, they talk to such students privately and provide some guidance on how to improve time management skills. They also mentioned that sometimes the students realize that they lack necessary time management skills and they come and ask for help.

> We create study schedules with my students. I think this is one of the best ways to improve the self-regulation process. Usually my students come to me with a certain schedule in their minds. However, I help them to prepare more detailed and goal oriented study schedules. [*Öğrencilerimle beraber çalışma programları yaparız. Bence özdüzenleme sürecini geliştiren en önemli şey bu. Genelde öğrencilerim bana kafalarında bir programla gelirler. Ama ben onlara daha hedef odaklı daha ayrıntılı programlar hazırlamaları konusunda yardımcı olurum.*] (Teacher 9)

> Usually I do not have to guide them to manage time, but sometimes they need that especially if there are under some stress. In such cases, we set weekly goals together and we check these goals at the end of each week. We assess to what extent they have attained these goals. This gives them relief and so they are able to study more efficiently. [*Genelde benim öğrencilerimi zamanlarını planlamaları için yönlendirmem gerekmiyor ama özellikle eğer bir stress altındalarsa buna ihtiyaçları oluyor. Bu durumda beraber haftalık hedefler koyarız, haftanın sonunda da beraber control ederiz bunları. Hedefe ne kadar*

ulaşabilmişler onu değerlendiririz. Bu onlar biraz rahatlatıyor, böylece de daha verimli çalışıyorlar.] (Teacher 4)

The interviews with the students support this result. A considerable number of the students (*f*=10) stated their teachers guide them so that they can better manage their time.

> Actually, I can say that I have been a well-organized student since 9th grade. I was studying before I started science high school, too, but I did not have a plan. I was not organized. Then I realized there are many more classes in science high school and I may not be able to succeed with my existing methods. Our guidance teacher helped me a lot. We created study schedules together. I followed those schedules. *[Aslında 9. Sınıftan beri düzenli bir öğrenci olduğumu söyleyebilirim. Liseye başlamadan önce de ders çalışıyordum ama bir planım yoktu. Düzenli değildim. Daha sonra fen lisesinde çok daha fazla ders olduğunu ve var olan yöntemlerimle başarılı olamayacağımı fark ettim. Rehberlik öğretmenimiz bana çok yardım etti. Birlikte çalışma programları oluşturduk. Bu programları takip ettim.* (Student 14)

In addition, teachers indicated that they *keep a record of students'* progress to encourage them to do self-regulation and keep studying. They emphasized that this strategy worked with their students and they felt more motivated to regulate their behaviors. At the end they started to study regulary because they monitored their students and provided feedback if necessary. The teachers (*f*=8) stated that they keep track of their students' learning until they internalize SRL.

> There are some students who want to study more efficiently, but they are not able to. That is maybe because they simply do not know how to do it. At this point, I cooperate with our guidance teacher and we keep track of our students' learning process together. We assign some tasks to such students and we check if they have completed such tasks on a regular basis. Thus, we manage to teach them how to be a well-organized student… After a while this student makes a habit of this and they do not need us that much anymore. *[Daha verimli çalışmak isteyen öğrenciler var ama yapamıyorlar. Bu belki de basitçe nasıl yapmayı bilmediklerinden. Bu noktada rehberlik öğretmeniyle işbirliği yapıyorum ve öğrencilerin gelişimini birlikte takip ediyoruz. Öğrencilere görevler verip bunları düzenli olarak yapıp yapmadıklarını kontrol ediyoruz. Böylece onlara düzenli bir öğrenci olmayı öğretmeyi başarmış oluyoruz… Zaten bir süre sonra bu öğrenci de bir ivme kazanıyor bize çok da ihtiyaç duymuyor.]* (Teacher 11)

> Sometimes I observe that the students get lost among all the high achievers. At that point, I talk to those students during the breaks and I try to understand what the problem is. Then I assign some tasks to them and I always check those.

> With that special attention, that student starts to study regularly, too.[*Bazen öğrencilerin çok başarılı öğrencilerin arasında kaybolduklarını gözlemliyorum. Bu noktada aralarda öğrencilerle konuşup problemi anlamaya çalışıyorum. Daha sonra onlara görevler verip bunları her zaman kontrol ediyorum. Bu özel ilgiliyle o öğrenci de düzenli çalışmaya başlıyor.]* (Teacher 3)

As seen in the interviews, the majority of teachers (*f*=8) assign individual tasks to the students and they check if those tasks are completed. In order to determine who needs such a support, they closely monitor their students and they cooperate with other teachers to achieve that. The majority of teachers reported that they have the chance to observe the results of this strategy in a relatively short period of time as students start to become more self-regulated. Additionally, they develop a better understanding of the subjects thanks to this support they get from their teachers. The interviews with the students are compatible with this result as the students (*f*=6) also mentioned that teachers *keep a record of their learning* which truly facilitates the SRL process.

> My guidance teacher gives me weekly homework and he checks these weekly tasks. I have some other friends just like me. He is helping them as well. He says you need to complete all the multiple choice questions until this exercise and we usually study considering that. This makes me study much more regularly. [*Aynı zamanda bana haftalık ödevler veriyor ve haftalık görevlerimi kontrol ediyor. Tıpkı benim gibi olan arkadaşlarım da var. Öğretmenimiz onlara da yardımcı oluyor. Şu etkinliğe kadar tüm çoktan seçmeli soruları tamamlamamızı söylüyor ve bizde genelde söylediklerini dikkate alarak ders çalışıyoruz. Bu sayede çok daha düzenli çalışıyorum ben.*] (Student 4)

> They assess my performance weekly and give me feedback on my performance. They make an analysis of our mistakes. Thanks to them, I improve my performance every week. *[Performansımı haftalık olarak değerlendiriyorlar ve geri dönüt veriyorlar.Hatalarımızın analizini yapıyorlar. Onların sayesinde performansımı her hafta geliştiriyorum]* (Student 6)

The results of the interviews with teachers also indicated that the teachers spend a considerable amount of time *teaching task strategies* to their students. While they sometimes do it in class, they stated they mostly do this during the breaks or after school. Furthermore, most of the teachers (*f*=13) pointed out that they suggest task strategies to their students considering learning style and interests. The teacher also stated that they give their students some tips about reaching correct information or using sources effectively.

> I never suggest a single learning strategy to my students. These are unique individuals and their learning strategies differ. Some students have a visual memory, so I suggest those students to use images. Some students like writing and drawing diagrams, so I suggest that they should study with this method. Some students learn best by listening, so I tell them to record their voice or listen to the subjects from the internet. Therefore, I observe my students and act accordingly. All these strategies help my students to learn without me. If they learn things without my help, they can go on learning after lessons, too. [*Öğrencilerime asla tek bir öğrenme taktiği vermiyorum. Onların hepsi ayrı bireyler ve hepsinin farklı taktikleri var. Bazı öğrenciler görsel hafızaya sahip bu yüzden onlara görseller kullanmlarını tavsiye ediyorum. Bazı öğrenciler yazmadan ve grafik çizmekten hoşlanıyor bu yüzden onlara bu yöntemle çalışmalarını tavsiye ediyorum. Bazı öğrenciler en iyi dinleyerek öğreniyor bu yüzden onlara kendi seslerini kaydetmelerini veya ineternetten ders dinlemelerini tavsiye ediyorum. Böylelikle öğrencilerimi gözlemleyip ona göre hareket ediyorum. Bütün bu stratejilerle öğrenciler bensiz de birşeyleri öğrenmeyi öğreniyorlar. Bu çok önemli çünkü bensiz bir şeyleri öğrenirlerse okuldan sonra da öğrenmeye devam edebilirler.]* (Teacher 6)

> My class that is Turkish is a field that requires a lot of practice and also you need to read a lot. Students should make a variety of text a part of their lives. Today, reading a text and interpreting the meaning are not a part of just my class, but all the other classes as well. Therefore, I believe if a student is good at Turkish, this contributes to the other classes as well. For this reason, I want them to read a lot. I motivate them to spare some time for reading. I assign 3 books to them each semester and then I did some follow up activities with them. This helped them both read more and manage time better. *[Benim dersim Türkçe ve bu yüzden çok okuma ve pratik gerektiren bir alan. Öğrenciler çeşitli metinleri hayatalarının bir parçası yapmalılar. Bu zamanda bir metni okumak ve yorumlamak yalnızca benim dersimin bir parçası değil aynı zamanda diğer derslerin de bir parçası. Bu yüzden bir öğrenci Türkçe dersinde iyiyse diğer derslere de katkısı olduğuna inanıyorum. Bu yüzden onların çok okumasını istiyorum. Onları okumaya zaman ayırmaları konusunda motive ediyorum. Onlara her dönem 3 kitap okuma görevi verdim ve daha sonra öğrencilerle birlikte bunları takip eden aktiviteler yaptım. Bu onlara hem okuma konusunda hemde daha iyi zaman yönetimi konusunda yardımcı oldu.]* (Teacher 5)

This result was also advocated by the students who expressed that their teachers teach a number of task strategies thanks to which they keep being self-regulated.

> My guidance teacher helps me a lot. He teaches me task strategies. I apply those strategies and now I am studying more efficiently. *[Rehberlik öğretmenim bana çok yardımcı oluyor. Bana etkinlikler ile alakalı taktikler öğretiyor. Bu taktikleri uyguluyorum ve şu an daha verimli ders çalışıyorum.]* (Student 7)

> I did not really know how to study for science classes. This is true especially for Physics course. My Physics teacher taught me how to study. I did exactly

what they told me... As I got better in Physics, I started to study more for Physics because I realized that I could be successful. *[Fen dersleri için nasıl ders çalışacağımı bilmiyordum. Özellikle de fizik dersi için. Fizik öğretmenim nasıl ders çalışacağımı öğretti. Bana dediklerini tam olarak yaptım. Fizik dersinde daha iyi oldukça bu derse de daha çok çalışmaya başladım yapabildiğimi gördükçe.]* (Student 4)

My high school teachers guided me to study. They taught me how to study actually. For example, I started use extra sources in Biology and I learned how to take notes with the guidance of my high school teachers... Now, I can study in a more organized way. *[Lise öğretmenlerim ders çalışmam konusunda bana rehberlik etti. Bana tam olarak ders çalışmayı öğrettiler. Örneğin biyoloji dersi için ek kaynakları kullanmaya başladım ve öğretmenlerimin yönlendirmesiyle nasıl not tutulacağını öğrendim. Şimdi daha düzenli çalışabiliyorum.]* (Student 8)

4.4.3.2.Building Rapport with Students

The results of the interviews with teachers revealed that teachers (*f*=15) who aim to support their students' SRL process and help them to succeed pay special attention to having a positive interaction with their students. They motivate their students in various ways or praise them within class or outside the class. When they realize that their students need some external motivation source to keep regulating their behavior, they praise their students or do motivational talks aimed to *enhance their self-efficacy*.

I do my best to boost their self-confidence. I always appreciate them when they make progress. Thus, they feel more motivated to learn both in class and after school. *[Öğrencilere özgüven aşılamak için elimden geleni yapıyorum. Onları ilerleme sağladıklarında her zaman takdir ediyorum. Böylece hem derste hem okuldan sonra daha motive olmuş hissediyorlar.*] (Teacher 9*)*

I told them that I would display their works on the school's board. Then we started to take part in various competitions together. We go to MUN conferences together. I give them constructive feedback on their works. I work hard to create a strong bond with them. This motivates them to study more and achieve more. [*Onlara çalışmalarını okul panosunda sergileyeceğimi söyledim. Daha sonra birlikte çeşitli yarışmalara katılmaya başladık. Birlikte MUN konferanslarına gidiyoruz. Onlara çalışmaları hakkında yapıcı geri bildirimler veriyorum. Onlarla güçlü bir bağ oluşturmak için çok çalışıyorum. Bu onları daha çok çalışmaya ve daha fazlasını başarma konusunda motive ediyor*.] (Teacher 8)

I create opportunities for my students to display their talents and express themselves after school. This helps them to build self-confidence. I believe self-confidence brings academic achievement. We organize debates, theatre

plays or various table talks after class. I praise their performance after such events, so they start to trust in themselves more. [*Öğrencilerimin okul sonrası yeteneklerini sergilemeleri ve kendilerini ifade etmeleri için fırsatlar yaratıyorum. Bu onların özgüvenlerini geliştirmelerine yardımcı oluyor. Özgüvenin başarıyı getirdiğine inanıyorum. Dersten sonra münazaralar, tiyatro oyunları veya çeşitli masa sohbetleri düzenliyoruz. Bu tür etkinliklerden sonra performanslarını övüyorum, böylece kendilerine daha çok güvenmeye başlıyorlar.*] (Teacher 5)

I always praise my students. This helps them to keep up with studying. [*Öğrencilerimi her zaman övüyorum. Bu onlara ders çalışmaya devam etmeleri konusunda yardımcı oluyor*.] (Teacher 14)

I give appointments to students in my free slots. We study together. I always emphasize that they can come and ask questions to me. I have a friendly attitude towards them. I think they feel free to ask questions to me as I am not a harsh or serious teacher. Thus, they feel more motivated to study. Sometimes I spend hours with them studying together or talking about their future plans. *[Boş zamanlarımda öğrencilere randevu veriyorum. Beraber çalışıyoruz. Gelip bana soru sorabileceklerini her zaman vurguluyorum. Onlara karşı arkadaşça bir tavrım var. Sert veya ciddi bir öğretmen olmadığım için bana soru sormakta özgür hissettiklerini düşünüyorum. Böylece ders çalışmak için daha motive oluyorlar. Bazen onlarla birlikte çalışarak veya gelecek planları hakkında konuşurken saatler geçiriyorum.*] (Teacher 2)

Students also expressed that the good relationship they had with their teachers increase their self-efficacy and so they felt much more motivated to study regularly:

In fact, my current teachers have not changed my study habits. They have done something more important for me. They helped me to enhance my self-confidence. They know that my dream is to study in the faculty of medicine. They always encourage me for that. They say I can rank high in this school. I can be among the first 5 students. They state that I have the potential and all I need to do is to study because I cannot do that unless I study regularly. They say if you study on a regular basis, you can realize your dreams. For this reason, I feel more motivated to study. *[Aslında, şu anki öğretmenlerim ders çalışma alışkanlıklarımı değiştirmedi. Benim için daha önemli bir şey yapıp öz güvenimi arttırmamda yardımcı oldular. Hayalimin tıp okumak olduğunu biliyorlar. Beni her zaman bu konuda cesaretlendiriyorlar. Bu okulda sıralamamın yüksek olabileceğini, ilk 5 öğrenci arasına girebileceğimi söylüyorlar. Potansiyelim olduğunu ve tek yapmam gerekenin ders çalışmak olduğunu belirtiyorlar çünkü bunu düzenli ders çalışmazsam bunu başaramam. Düzenli bir şekilde çalışırsam hayallerimi gerçekleştirebileceğimi söylüyorlar. Bu yüzden ders çalışmak için daha motive oluyorum.]* (Student 6)

In addition to increasing their self-efficacy, one teacher underlined that he pays special attention to have a good relationship with his students so that he can guide them better to regulate themselves. Their aim is to earn the trust of the students as a good guide:

> I often provide them with study schedules. However, I always do that only after I manage to create a certain bond with me and the students. Once I feel that they have accepted me as a good academic source and once I feel that I have earned their respect and acceptance, then I start to give them study schedules. After this point, everything is easier for me as I can shape them as I want and I tell myself that they are ready to study hard. *[Onlara genelde çalışma programları veriyorum. Ancak bunu sadece öğrencilerimle aramda belli bir bağ kurmayı başardıktan sonra yapıyorum. Beni iyi bir akademik kaynak olarak kabul ettiklerini hissettiğimde ve saygılarını kazandıktan sonra onlara çalışma programları vermeye başlıyorum. Bu noktadan sonra her şey benim için daha kolay oluyor çünkü onları istediğim gibi şekillendiriyorum ve kendime çok ders çalışmaya hazır olduklarını söylüyorum.]* (Teacher 13)

4.4.3.3.IT Integration

The analysis of the interviews with teachers also revealed that teachers benefit from technology so as to help their students engage in more learning tasks after school. They (*f*=15) mostly benefit from the technology so as to help student self-regulate:

> I recommend my students to download certain applications. These applications help them to use their cellphones for educational purposes. For example, there is an application called geogebra enabling our students to use graphics there. This enables them to be busy with educational applications after school. [*Ben öğrencilere bazı uygulamaları indirmelerini tavsiye ediyorum. Bu uygulamalar telefonlarını eğitim amaçlı kullanmalarını sağlıyor. Örneğin; geogebra diye bir uygulama var öğrencilerimizin grafikleri kullanmasını sağlıyor. Bu da öğrencilerin dersten sonra eğitimle ilgili uygulamalarla haşır neşir olmasını sağlıyor.*] (Teacher 12)

> I use technology a lot in Chemistry course…I assign them some the topics to do research after school. Thus, they learn a lot better. [*Ben kimya dersinde teknolojiyi çok kullanıyorum. Yoksa çok soyut olur öğrenciler için. Beraber bakıyoruz görsellere. Onlara bazı konular veriyorum okuldan sonra araştırmaları için. Böylece çok daha iyi öğreniyorlar.*] (Teacher 14)

Thus, some online applications are also a part of their instruction which helps them to motivate their students to keep learning after school. Thus, IT integration has been put forward as an essential element of the instructional factors promoting the use of SRL skills.

4.4.3.4.Collaborative Activities

As stated earlier the analysis of the data of this study showed that collaboration is a very important element in SRL process. The analysis of the teacher interviews also showed that teachers (*f*=11) show a great deal of efforts to have their students collaborate. This includes in-class activities as well as the group assignments given to the students.

> I almost never assign individual tasks to my students. I think they better learn by asking questions to each other. I assign Math problems to pairs or groups. They solve them together. You know what they say "bir elin nesi var iki el şaklar." They cannot procrastinate when they study together. They definitely complete the task as a group. I observe them gettim together and starting to study right after school. (A Turkish proverb whose meaning is close to the English idiom "*Together we rise divided we fall*.") [*Öğrencilere hemen hiç bireysel ödev vermem. Bence bir birlerine soru sorarak daha iyi düşünebiliyorlar. İkili veya daha fazla gruplara matematik problemleri veririm. Beraber çözerler. Ne demişler "Bir elin nesi var iki el şaklar*". Birlikte *çalışacakları zaman kaytaramıyorlar da. Mutlaka yapıyorlar verilen görevleri. Bakıyorum okuldan sonra hemen toplanıyorlar başlıyorlar çalışmaya.*] (Teacher 1).

> I group students into 3 or 4 and then I assign some tasks to those groups. When I keep doing it a couple of times, students start to develop habits of studying regularly. Then I observe that they can be much more successful. [*Öğrencileri 3 veya 4 gruba ayırıp bu gruplara görevler veriyorum. Bunu birkaç kere yaptığımda öğrenciler düzenli çalışma alışkanlığı kazanıyorlar. Daha sonra daha başarılı olduklarını gözlemliyorum.*](Teacher 4)

These findings have been supported by the student interviews as well since they have also declared that collaborating with other students is a key component in their self-regulation process. Considering these findings, we can conclude that students can regulate their learning process better, if they cooperate with other students and teachers can effectively enhance this process.

4.4.3.5.Activating Prior Knowledge

Revising the previous subjects or activating schemata of the students is one of the methods that the teachers employ. The majority of the teachers (*f*=9) stated that they give importance to activating prior knowledge of the students. They do this both to

enhance their instruction and to set a role model for their students so that they do the same thing when they are studying:

> I always start my lesson by reminding them of the previous subjects. That is one of my rules. I think we can prepare our students for our lesson to the extent we increase their readiness. I often tell my students to do the same thing when they are studying on ther own. Thus, I believe they can study much more efficiently. [*Ben derse daima öğrencilere eski konuları hatırlatarak başlarım. Bu benim kurallarımdan biri. Bence öğrencilerimizin hazırbulunuşluklarını arttırdığımız ölçüde onları derse hazırlayabiliriz… Öğrencilerime de sık sık kendileri çalışırken de aynı şeyi yapmalarını söylerim. Bence böylece daha verimli çalışabilirler.*] (Teacher 6).

> I teach Chemistry as you know and it is crucial for my lessons to link the subjects to one another. For this reason, I revise previous lessons at the beginning of my lesson. I have a notebook to do that… I advise my students to do the same thing for Chemistry lesson. It is essential. This also makes studying easier for them. Otherwise, they cannot see the connection between the subjects. [*Bildiğiniz gibi ben kimya öğretiyorum ve beim dersimde konuları birbirine bağlamak çok önemli. Bu yüzden, eski konuları tekrar ediyorum dersimin başında. Bir not defterim var bunu yapmak için… öğrencilerime de aynı şeyi yapmalarını tavsiye ederim. Bu çok önemli. Bu bir de ders çalışmayı kolaylaştırıyor onlar için. Yoksa bağlantıları göremezler konular arasındaki.*] (Teacher 3).

Thus, activating prior knowledge has appeared as an important theme during the analysis of the teacher interviews. Based on these findings we can also infer that the style of teachers and students are compatible with each other. To clarify, the analysis of the student interviews as well as SRSS also revealed that activating prior knowledge is an important task strategy. Many students declared that they start studying by revising previous the topics first and remembering what they already know.

4.4.3.6.Generating academic interest in students

The results of the interviews with both teachers and students revealed that teachers employ some methods to generate academic interest in students. They aim to enrich SRL process by making students interested in academic subjects. The results of the interviews with high school teachers showed that science high school teachers do this a range of ways. First, they *create a positive learning atmosphere* in class so that students develop a positive attitude towards that course and keep learning after school too. Teachers (*f*=9) clearly stated that they are doing this to make learning process

more fun for their students and they also want them enjoy learning process so that they continue learning later on.

> I think students cannot learn in tense environments. I do my best to create a positive atmosphere in class. I use humor, I make jokes and I stay positive in class. Thus, they feel more motivated for my course…They feel more enthusiastic to study regularly for your lessons. [*Bence öğrenciler gergin ortamlarda öğrenemezler. O yüzden sınıfta pozitif bir ortam yaratmak için elimden geleni yapıyorum. Espriler, şakalar yapıyorum, derste pozitif oluyorum. Böylece benim dersim için daha motive oluyorlar… Okuldan sonra da sizin dersinize düzenli çalışmaya özen gösteriyorlar.*] (Teacher 6).

> My whole teaching is built on making students feel more enthusiastic for learning something new. That's why I have a smiling face in class. I want them to feel curious to learn. I want them to keep learning after school. [*Benim öğretmenliğim öğrencileri yeni bir şey öğrenmeye karşı heveslendirmek üzerine kurulu. O yüzden sınıfta güler yüzümle giriyorum. Öğrenmeye heves etmelerini istiyorum. Okul bitince de öğrenmeye devam etmelerini istiyorum.*] (Teacher 10).

This method was raised by the teachers, but it was justified by the students as well. Some students expressed that when their teacher has a positive attitude in class, they feel more motivated to study for that course. Also, this helps them to create a bond with their teacher. Thus, they feel ease at asking questions to their teachers. All in all, creating a positive atmosphere has been determined as a factor enhancing SRL process as emphasized by both teachers and students.

With the same purpose in mind, that is generating academic interest in students, teachers use *questioning technique*. The importance of this technique was underscored by all the teachers (*f*=15) participating in the study, but only some of them (*f*=3) stated that they use it to enhance SRL process of their students. The teachers expressed that they ask many questions to their students so as to encourage them to think and question the information provided. They also do that so as to make them active listeners of their lesson. They underlined that if they do not keep the students active with this method, the students tend to daydream or pay less attention. However, when their teachers ask a variety of questions, the students feel obliged to listen, think and reply. When it comes to the SRL promotion, teachers aim to arouse academic interest in their students so that they regulate their acts to study for that course after school.

I ask them many questions and always encourage them to ask questions. I do not just provide formulas. I also provide the justification of the formulas. Having them think critically is a crucial element of teaching. Then students may continue studying by asking questions without the teacher. That's my aim. [*Ben öğrencilerime bir sürü soru soruyorum onları da soru sormaya teşvik ediyorum. Formüllerin sağlamasını da veriyorum. Onların eleştirel düşünmesini sağlamak benim öğretmenliğimin önemli bir parçası. O zaman öğretmen yokken de soru sorarak çalışabilirler. Benim amacım bu.*] (Teacher 1).

My lessons are all about asking questions. This is beneficial for them and for myself as well because with the help of the answers that the students gave I can teach the topic better and in a more comprehensive way. I can plan a perfect lesson in my head, but that could be boring for my students because it would be my lesson only. However, when I ask questions, the lesson becomes a common product of us. They also become more interested in my lesson. This is a circle. As they are interested, they study more. As they study more, they become more successful. [*Benim dersim hep soru sormakla geçer. Bu öğrenciler için de faydalı benim için de çünkü onların verdiği cevaplarla konuyu daha iyi daha kapsamlı öğretebiliyorum. Kafamda mükemmel bir ders tasarlayabilirim ama bu öğrenciler için sıkıcı olur çünkü sadece benim dersim olur. Ama soru sorduğum zaman hepimizin ortak ürünü oluyor bu ders.benim dersimle dha çok ilgilenmeye başlıyorlar hem. Bu bir döngü. Daha çok ilgilendikleri için daha çok çalışıyorlar. Daha çok çaıştıkları için daha başarılı oluyorlar.*] (Teacher 11).

4.4.3.7.Linking Class Content with Daily Life

Last but not least, during the interviews with teachers, they (*f*=11) stated that one of their major goals is to have their students continue learning after school. By linking the class content with the daily lives of their students, teachers both help students link with the new content with already existing knowledge in their mind and carry on learning after school.

I have my students to connect real life and class content. For this reason, we did some projects this semester. They wrote a review for a book they read or a movie they watched. While they are doing that they used the expressions that we learned in class. They integrated class content into this project. Thus, I enabled them to study English after school. [*Ben öğrencilerimin dersin içeriği ile gerçek hayatı birleştirmesini sağlarım. Bu yüzden, bu dönem bir proje yaptık. Okudukları bir kitap ya da izledikleri bir film ile ilgili değerlendirme yazdılar. Bunu yaparken de derste öğrendiğimiz ifadeleri kullandılar. Dersin içeriğini bu projeye entegre ettiler. Böylece okuldan sonra da İngilizce çalışmalarını sağlamış oldum.*] (Teacher 8).

> While teaching, I pay special attention to give examples from real life. For example, while I am teaching cosmology, I gave the examples that attract their attention. I talk about how the glass is made or the principles of refrigerators. I give examples related to family life or the universe. This generates curiosity among them. With this technique, I am usually able to make everyone curious in the class. When they feel curious like that, they keep researching after school. They use the internet to learn something… I actually do this to have them keep studying after school. [*Ders anlatırken gerçek hayattan örnekler vermeye dikkat ederim. Örneğin, kozmoloji konusunu işlerken dikkatlerini çekecek örnekler veririm. Cam nasıl yapılır onu anlatırım, buzdolabının çalışma prensibini anlatırım. Aile hayatından ya da evrenden örnekler veririm. Böylece merak uyandırırım. Bu teknikle genelde sınıftaki herkeste merak uyandırmayı başarırım. Böyle merak ettiklerinde genelde okuldan sonra da araştırmaya devam ediyorlar. Birşeyler öğrenmek için internet kullanıyorlar… Bunu aslında okuldan sonra çalışmaya devam etsinler diye yapıyorum.]* (Teacher 2).

Building on these, it is clear that the analysis of the student interviews signaled a great impact of the teachers on the development of SRL skills. While primary school teachers can be described as the starting point of SRL, middle and high school teachers can be described as guides that lead students to better regulate their lives and studies. Besides, regardless of the level, teachers who teach their students task skills and guide them to use extra sources have been reported to have a positive impact on the SRL process of their students. Also, building rapport with students and helping students to enhance their self-efficacy are among the important things that teachers do which helped them to better regulate themselves. Finally, it is important to note that science high schools are boarding schools as mentioned before. Therefore, as a part of their instruction these schools have compulsory study hours for their students every weekday. In these study hours students get together and study together. Also, one teacher stays with them, and patrols in the school on weekdays. This element of the science high schools was reported by the students to be useful in developing SRL skills by the students as students have chance to get help from both their peers and teachers during these study hours. In addition, seeing other students studying regularly provides a model for other students which encourages them to study regularly as well. Thus, it is possible to conclude that primary school teachers, middle school teachers and science high school teachers, as well as the collaboration among the students are the key instruction related factors which were pointed out during the interviews with the students.

4.5. Student Related Factors Promoting the SRL Strategies of Students

One of the areas that the present research focuses on was the student related factors that affects the development of SRL. The analysis of both teacher and student interviews revealed several student related factors that promote the development of SRL.

4.5.1. Parental Support

First of all, several teachers (f=7) indicated that parents have a big impact on the SRL development of their students. They expressed that the parents of self-regulated kids are either well-educated or have strong opinions about their children's education. That is, they attach importance to training of their children.Teachers particularly emphasized that their students are coming from middle-class families who do everything in their power to provide a high quality education for their kids. The teachers also stressed that they feel the importance that the parents attach to the education of their children whenever they communicate with the parents and the parents do not hesitate to allocate an important amount of a budget for the extra courses, extra sources or any kind of extracurricular activity that their children want to do.

> We have students from different parts of Anatolia. We used to have more students from the working class, but now we have many students from middle class. Clearly, their families support them in every way so that they succeed. This is not just about telling them to study. Obviously, a parent in each family accompanied these kids while they were studying… They seem to have trained their kids on how to study. These kids obviously developed the habit of studying regularly at a young age. [*Bize anadolunun çeşitli yerlerinden öğrenci gelir. Daha çok işçi sınıfından öğrencimiz olurdu ama şimdi daha çok orta sınıftan öğrencimiz var. Açıkçası bu öğrenciler başarılı olsun diye ailesi her anlamda destekliyor. Bu sadece onlara çalış demekle de değil. Her ailede bir ebeveyn belli ki eşlik etmiş bu çocuklara çalışırken. Çocuklar nasıl çalışacağı konusunda eğitilmişe benziyorlar. Bu çocuklar düzenli çalışma alışkanlığını erken yaşta edinmişler açıkçası.*] (Teacher 6)

> In my opinion, our students are coming from families who spare a considerable amount of time for their children obviously, they coached these kids. They hired private tutors, sent them to extra courses or bought extra sources for them. They worked as much as their kids. That's why these kids have such personality traits. They know how to manage time. They know how to study efficiently.

> [*Bence bizim öğrenciler onlara çok vakit ayıran ailelerden geliyorlar. Bu çocukları belli ki ailesi yönlendirmiş. Özel öğretmen tutmuş, kurslara yollamış, extra kaynaklar almış. Çocuklar kadar onlar da çalışmış. Bu yüzden bu çocuklar bu özelliklere sahip olmuş. Zamanlarını nasıl kullancaklarını biliiyorlar. Nasıl verimli çalışacaklarını biliyorlar.*] (Teacher 1)

> I think the self-regulated skills of these students are the result of a combination of many factors, but the most important factor is families. The families of these kids somehow balanced the amount of control they exercised over their kids and the freedom they provided. These kids can control themselves and do multitasking. Mostly their parents are teachers. But sometimes kids from the same families have different attitudes as well. Maybe this is a combination of family and the personality of the kid. [*Bence özdüzenleme becerisi birçok faktörün birleşmesiyle oluyor ama en önemli faktör aileler. Bu aileler bir şekilde kontrol miktarını ve özgürlüğü dengeliyorlar. Bu çocuklar kendilerini kontrol ediyorlar ve aynı anda birçok şeyi yapıyorlar. Genelde velileri öğretmen. Ama bazen aynı aileden gelen çocuklarırn farklı tutumları da olabiliyor. Belki de bu ailenin ve çocuğun kendisini birleşimiyle oluyordur*.] (Teacher 4)

As seen in the quotes, many teachers (*f*=7) believe that the students with SRL skills are outcomes of diligent parents who take the education of their kids seriously and put active efforts to help them to be more self-regulated. As stated by one teacher, these parents have been reported to find a balance between checking on their kids and giving them some authority or responsibilities. The analysis of the interviews conducted with the students are compatible with what their teachers indicated. The majority of the students (*f*=12) stated that their parents have a huge impact on them in terms of developing SRL skills. They stated that their parents are actually the ones who started the SRL process. Based on the analysis of the student interviews, it is possible to state that the parents *raise an awareness of regulating their behavior*, setting goals or learning strategies.

> My dad has had a huge impact on me. He basically taught me how to learn. He would tell me that I should go to my classes well-prepared. I should daily revise what I learned that day. With his guidance, I developed study habits. [*Babamın benim üzerimde büyük etkisi oldu. Bana nasıl öğreneceğimi öğretti aslında. Derslere hazırlıklı gitmemi söylerdi. O gün ne öğrendiysem günlük olarak tekrar etmem gerekirdi. Onun yönlendirmesiyle ders çalışma alışkanlığı kazandım.*] (Student 7)

> When I was in primary school, my mum created a certain routine at home and then since then I can say that I have been following the same routine. I used to start studying after I came home and ate some snacks. Then I started to study

immediately after that. I still do that. [*Ben ilkokuldayken annem belli bir rutin oluşturmuştu evde, o zamandan beri de aynı rutini devam ettiriyorum diyebilirim. Eve gelip bir şeyler atıştırdıktan hemen sonra başlardım çalışmaya şimdi de aynı şekilde yapıyorum.*] (Student 4)

However, the analysis also showed that the methods that families used so as to raise this awareness vary. Some of them *accompanied the studying process* of their kids and became a party of the process:

> My mum was my study partner. I was studying a subject and then I was summarizing it to my mum. My mum is a curious person. She is interested in academic subjects. Therefore, she was listening to me attentively. She was also asking relevant questions. This really helped me to develop studying strategies. [*Annem benim çalışma partnerimdi. Bir konuyu çalışırdım sonra da anneme özetlerdim. Annem de meraklı bir insan. Akademik konulara ilgisi var. Bu yüzden de beni dikkatli dinlerdi. Konuyla alakalı sorular da sorardı. Bu ders çalışmayı taktikleri geliştirmeme cidden yardım etti.*] (Student 9)

> My mum made me read books and summarize them for her. She spent much time with me. She clearly gave importance to my education. It was her priority. Now it is my priority as well I guess. I organize my life considering my studies. [*Annem bana kitap okuttururdu sonra da özetlettirirdi. Benimle bayağı vakit geçirirdi. Açıkçası eğitime çok önem verirdi. Eğitim onun önceliğiydi. Şimdi benim de önceliğim sanırım. Hayatımı derslerimin düşünerek organize ediyorum*.](Student 11)

Some others taught them *task strategies* and set examples of *time management* as well as *emotional regulation*:

> My parents always told me that I had a great potential. They emphasized that unless I gave up, I could succeed in anything I wanted. Today, sometimes I have to study at nights or I have a lot of difficulty solving a complex problem. At those times, my internal voice tells me that I can do it. [*Ailem her zaman bende büyük bir potansiyel olduğunu söyledi. Hep eğer vazgeçmezsem istediğim her şeyi başarabileceğimi söylediler. Bugün bazen geceleri çalışmak zorunda kalıyorum, bazen de karmaşık bir problemi çözmekte zorlanıyorum. Bu zamanlarda iç sesim bana yapabileceğimi söylüyor.*](Student 14)

> I was feeling the strict discipline in our home. I had to complete my homework before dinner. I had to check the topics of the following day before I slept. Otherwise, they would not buy me the toys or the magazines that I liked. [*Bizim evdeki o sıkı disiplini hep hissediyordum. Ödevimi akşam yemeğinden önce tamamlamak zorundaydım. Uyumadan önce de bir sonraki günün konularına bakmak zorundaydım. Yoksa istediğim oyuncak veya dergi alınmazdı.*](Student 2)

> My mum taught many things to me. Both of my parents are teachers, so I can say that they were good at guiding me. My mum strongly suggested me that I should learn in class. She was right. That's why I listen to my teacher carefully. She taught me to check the subjects of the following day. I still do that. But most importantly my parents taught me to do multitasking. I have always had a course to attend or a task to complete. I developed a lot of skills thanks to that. [*Bana birçok şeyi annem öğretti. Benim annem de babam da öğretmen, o yüzden beni çok iyi bir şekilde yönlendirebildiler. Annem beni hep derste öğrenmeye teşvik etti. Haklıydı da. Bu yüzden de öğretmenimi çok dikkatli dinlerim. Bana bir sonraki günün dersinin konularına bakmayı da öğretti. Bunu hala da yaparım. Ama en önemlisi bana ailem aynı anda birçok şeyi yapabilmeyi öğretti. Her zaman gidecek bir kursum ya da yapmam gereken bir şey olurdu. Bu sayede birçok beceri kazandım*.] (Student 15)

Considering the analysis of the student interviews, it is possible to infer that parents have impacted the SRL process of their children in various ways. They have found ways to encourage their children to study and provided their children with training related to the learning strategies that they can utilize. One way or another, they have become an active part of the SRL development. As stated before, their contribution has been acknowledged by the majority of the students.

4.5.2. Siblings

The analysis of the student interviews revealed that siblings have an important impact of the SRL process of the students. Some students (*f*=4) emphasized that their siblings facilitated their SRL process. They *set good role models* for them. These students declared that they organized their lives to be successful so that they could be like their sister or brother. For example, one student said:

> I have very good role models. One of them is my elder sister. She studies hard, but she does other social activities too. She was managing life very well. Now I am doing to the same thing. I study, but I do not study all the time. I socialize too. I have other hobbies, too. I go out with my friends. I have learned to manage my time and organize my life. [*Benim çok iyi rol modellerim oldu. Bir tanesi ablam. Ablam çok çalışır ama aynı zamanda sosyal aktiviteler de yapar. Hayatını çok iyi yönetir. Şimdi ben de aynı şeyi yapıyorum. Çalışıyorum ama her zaman çalışmıyorum. Sosyalleşiyorum da. Hobilerim de var. Arkadaşlarımla da çıkıyorum. Zamanımı yönetmeyi ve hayatımı organize etmeyi öğrendim.*] (Student 10)

Thus, as seen in the quote above some students (*f*=4) highlighted that they were able to regulate themselves better because their sister or brother was highly self-regulated.

Besides, they added that they were organizing their lives because there was somebody else doing that at their home and they have been observing this sibling since the early years of their lives.

Additionally, siblings were reported to have a positive impact on the SRL process by *providing companionship*.

> I really enjoy studying with my sister. She studies in her table. I study in my table. We take breaks at similar times. This motivates me a lot. *[Ben kızkardeşimle çalışmaktan zevk alırım. O kendi masasında çalışır ben de kendi masamda çalışırım. Benzer zamanlarda ara veririz. Bu beni bayağı motive eder.*] (Student 7)

> Studying with my sister makes me feel better. I can always ask her questions if I have difficulty understanding something. *[Kız kardeşimle çalışmak beni daha iyi hissettiriyor. Bir şeyi anlamakta zorlanırsam her zaman ona sorabilirim*.] (Student 11)

Thus, as seen in the quote above some students (*f*=3) said that they were regulating themselves easily because they had a study partner.

Finally, one students reported that his sibling had a positive impact on his SRL process because he was *coaching the process*:

> My elder brother motivated me to study, but he had a unique method. He was comparing me with the other kids that we know. He was telling me that "Look, he is very smart, he can solve very complex Math problems, but you cannot because you do not focus. He gives all his attention." Then I started to do everything to focus more. I started to study on a regular basis. I used all my energy to study. I did this to prove him wrong. [*Beni abim motive etti çalışmaya ama sıradışı bir metodu vardı. Beni bizim tanıdığımız diğer çocuklarla kıyaslardı. Bana diyordu ki "Bak o çok zeki, çok zor matematik problemlerini çözebiliyor ama sen çözemiyorsun. O kafasını veriyor çünkü sen veremiyorsun. Sonra odaklanmak için her şeyi yaptım. Düzenli çalışmaya başldım. Bütün enerjimi çalışmaya harcadım, onu haksız çıkarmak için.*] (Student 8)

4.5.3. Social Background

The impact of the social background appeared as an interesting individual factor affecting the SRL process. While some students (*f*=5) stated that their social background had a positive impact on their SRL development process, but there is not a single pattern of the impact that the social environment created. In some cases,

studying regularly was the norm of the social background of the student. The student wanted to *fit in their social background* and so started to study regularly:

> I am from Kadirli, a small town next to Osmaniye. In our town, there are a lot of high achievers. Every year, we have the top ranking students in the university entrance exam. We have always been in a competition with each other. I think this has made me an ambitious person. Also, I realized that I can be successful just like them. I think this has made me study more. I have seen great examples of dedicated students who arrange everything around their study program. I think this has helped me become like that too. *[Ben Kadirli'denim. Osmaniyeye yakın küçük bir ilçe Kadirli. Orda çok fazla başarılı öğrenci oluyor. Her yıl üniversite sınavında derece çıkarıyor. Her zaman birbirimizle rekabet halinde olduk. Bu da beni hırslı bir insan yaptı. Bir de çalışırsam onlar gibi başarılı olabileceğimi anladım. Bu da beni daha çok çalışmaya itti.* Harika örnekler gördüm, kendini çalışmaya adayan her şeyi ona göre ayarlayan. Bence bu bana bayağı yardımcı oldu ben de biraz öyle oldum.](Student 7)

However, in some other cases the social background of the students did not really attach importance to academic education and the students had the *desire to be different* from them:

> My social environment has had the opposite effect on me. No one in my neighborhood and none of my cousins went to a good university. They did not give importance to school or study after school. They did not read books or follow any studying schedule. Studying did not have an important place in their lives. I guess I wanted to be different. Studying was in the center of my life and I organized the other things around it. [*Benim sosyal çevremin bende tam zıt etkisi oldu. Benim mahallemden ya da kuzenlerimden kimse iyi bir üniversiteye gitmedi. Okula çok önem vermezlerdi, okuldan sonra çalışmazlardı. Ders çalışmanın hayatlarında önemli bir yeri yoktu. Sanırım ben farklı olmak istedim*. Ders çalışmak benim hayatımın merkezinde, ben diğer şeyleri ona göre ayarlıyorum.] (Student 5)

Finally, some students (*f=2*) stated that people around them supported their learning process and appreciated their achievement, so they study hard so as to maintain this reputation and *meet the expectations*:

> Everyone in my social circle motivated me to study. They praised my success. …. They also underlined how well-organized I was. I did not want to let them down. I managed to organize my life so well thanks to this motivation. I have always set goals. My goal was to study at a good science high school and now my goal is to study in a good university. I have always been studying regularly to reach these goals. [*Benim çevremdeki herkes beni çalışmaya motive etti.*

Başarılarımı takdir ettiler. Hep işte benim ne kadar düzenli olduğumu vurgularlardı. Onları hayal kırıklığına uğratmak istemedim. Bu motivasyonla hayatımı organize etmeyi öğrendim. Her zaman da hedeflerimi koydum. Hedefim iyi bir fen lisesinde okumaktı şimdi de hedefim iyi bir üniversitede okumak. Bunlar için hep düzenli çalıştım.] (Student 11)

4.5.4. Peer Colloboration

Peers have been reported to have a significant impact on the way that the students regulated themselves. This variable has been noted by both teachers and students. The teachers have stated that as the students see each other very often, they have a great potential to influence the behaviors of each other. As there is a considerable number of highly self-regulated students, they affect the others in a positive way. Students often do not feel the need to ask questions to their teachers as their peers are there to help them. This prevents the feeling of helplessness that might arise in students, and they keep studying or regulating themselves since they are able to find answers to their questions easily. All the teachers (*f*=15) underlined that the peers are one of the main reasons for why these students stay self-regulated. According to the teachers, students feed their SRL process in two ways. First, thanks to the collaboration between the students, they keep regulating their behavior because they *provide inspiration* to each other:

> Students have groups of 3 or 4 and they study together. .. They motivate each other a lot. They enjoy the process I think. This might be one of the major reasons for why the students are able to find motivation almost all the time. They study sometimes late at night together. [*Öğrenciler genelde üçlü dörtlü gruplar halinde birlikte çalışırlar. Birbirlerini bayağı motive ediyorlar. Bence onlar bu süreci seviyor o yüzden de hep motivasyon bulabiliyorlar. Bazen gece geç saate kadar birlikte çalışırlar.*] (Teacher 4)

> I can definitely say that they learn together. Before they come to us, they discuss that the topic among themselves and they come and ask questions to us if they cannot really comprehend the subject. They motivate each other to study. Sometimes, I think they are like the parts of the same puzzle and they complete each other. [*Öğrenciler beraber öğreniyorlar diyebilirim kesinlikle. Bize gelmeden önce genelde kendi aralarında tartışırlar, bize konuyu anlamazlarsa gelip soru sorarlar. Bir birlerini teşvik ederler çalışmak için. Bazen onları bir yapbozun parçaları gibi düşünüyorum, birbirlerini tamamlıyorlar.*] (Teacher 10)

Second, the students can enhance the SRL process of other students by *providing good role models*:

> The communication and collaboration between the students have a great impact on them. Sometimes, older students who have been accepted to the top universities visit our school and talk to the students. They give some tips. The things they say are much more influential than the things we said because they have recently gone through the same path. These types of things motivate them a lot. They set new goals thanks to these gatherings. Also, the students share task strategies or tactics and sources with each other which helps them succeed together. [*Öğrencilerinin arasındaki iletişimin, yardımlaşmanın üzerlerinde büyük etkisi var. Bazen iyi bir üniversiteye giren yaşça daha büyük öğrenciler gelirler okulumuzu ziyarete ve öğrencilerle konuşurlar. Bazı taktikler verirler. Onların söyledikleri şeyler bizim söylediklerimizden çok daha etkili oluyor çünkü onlar aynı yoldan geçtiler. Bu tarz şeyler öğrencileri çok motive ediyor. Bu toplantılar sayesinde yeni hedefler koyuyorlar. Bir de öğrenciler bir birleri ile taktikler paylaşırlar extra kaynaklar paylaşırlar bu beraber başarmalarına yardımcı olur*.] (Teacher 3)

The analysis of the student interviews supported the findings of the analysis of the teacher interviews. Students (*f*=13) underlined that their peers are key elements of their self-regulation process. Even though they do not feel like studying sometimes, they are positively influenced by their peers and start to study. Just as their teachers, the students indicated that their peers *provide inspiration* to them to be more regulated:

> In some lessons, our teachers let us study. They let us use these lessons as study hours. Even though we do not want to study, we keep silent so that our friends can study. And then some time later we start to study too as we feel more motivated as we see them studying. I think I study much more efficiently thanks to my friends. [*Bazı derslerde hocalar bizi bırakıyorlar çalışalım diye. Yeni hani bu dersleri etüt saati olarak kullanmamıza izin veriyorlar. Çalışmak istemesek bile sessiz duruyoruz ki arkadaşlarımız çalışabilsin. Bir süre sonra biz de çalışmaya başlıyoruz onlardan görerek çünkü daha motive oluyoruz. Bence ben arkadaşlarım sayesinde çok daha verimli çalışıyorum*.] (Student 14)

> When I first started science high school, I was not studying at all. My grades were really low. And then I started to study again because of the effect of my friends. The atmosphere of the science high school impacted me a lot. Everybody was studying, but I was wasting time. Then I thought why I was wasting time. Then I started to study regularly too. I was taking breaks or spent time doing other stuff when they were doing these. Then step by step I became a well-organized student as well. I think I owe this to my friends. [*Ben fen lisesinde ilk başladığımda hiç çalışmıyordum. Notlarım cidden düşüktü. Sonra arkadaşlarımın etkisiyle tekrar çalışmaya başladım. Fen lisesinin ortamı beni bayağı etkiledi. Herkes çalışıyordu ama ben zamanımı boşa harcıyordum.*

Sonra ben de düzenli çalışmaya başladım. Onlar çalışırken ben ara veriyordum öncden ya da işte başka şeyler yapıyordum. Sonra adım adım ben de düzenli bir öğrenci oldum. Bence bunu arkadaşlarıma borçluyum.] (Student 12)

Moreover, they added that their peers are *teaching SRL strategies* to them which they utilize and thanks to their peers they have become much more self-regulated:

> My friends showed me many strategies to study more efficiently. They say stuff like "if you use post-its, it is much more effective." Then I start to try their strategies. They have a huge impact on me I can say. We generally study together. We solve many problems together. We give each other tips on how to solve complex Math problems. Generally, this helps a lot. [*Arkadaşlarım bana bir sürü verimli çalışma stratejisi gösterdi. Işte mesela şey diyorlardı "post-it kullanırsan çok daha verimli olur." Ben de denedim sonra onların stratejilerini. Benim üzerimde bayağı etkileri oldu diyebilirim. Birlikte çalışıyoruz genelde. Birlikte problem çözüyoruz. Bir birimize taktik veriyoruz zor matematik problemlerini çözmek için. Genelde çok faydası oluyor*.] (Student 2)

> In the past, I did not really know how to study Biology efficiently. One of my friends gave me some tactics. He taught the subjects to me with the help of some visuals. Then I realized that I should study Biology with visuals. Thus, I started to study using this strategy. Also, Physics was my nightmare. A friend of mine suggested studying Physics subjects by using Physics problems. Then I gradually started to understand. My friends helped me to succeed in these subjects. Then I started to study willingly. [*Eskiden ben gerçekten bilmiyordum biyoloji nasıl çalışılır. Bir arkadaşım bana biraz taktik Verdi. Bana biraz görsellerle anlattı konuyu. Sonra anladım ki biyolojiyi görsellerle çalışmam gerek. Böylece ben de bu taktikle çalışmaya başladım. Bir de Fizik benim kabusumdu. Bir arkadaşım fiziği problemler yoluyla çalışmamı önerdi. Sonra yavaş yavaş anlamaya başladım. Arkadaşlarım yani yardımcı oldu bu derslerde başarılı olmamda*.] (Student 7)

> We are in a strong cooperation with our friends. For example, my friends suggest me extra sources to study. I can say that they actually taught me how to study. We share information related to useful sources and problem solving tactics with one another. Also, my friends help me to evaluate myself. For example, they ask me questions and I can see whether I have actually learned that subject or not. Lately, my friends asked me questions related to integral and I have been able to solve those problems. That has made me feel better about myself. I thought I have learned well. [*Biz arkadaşlarımla bayağı yardımlaşıyoruz. Arkadaşlarım bana extra kaynaklar önerirler mesela. Aslında bana çalışmayı öğrettiler diyebilirim. Bir birimizle güzel kaynakları paylaşırız ya da işte soru çözümü ile ilgili bilgileri paylaşırız. Bir de benim kendimi değerlendirmeme de yardımcı olur arkadaşlarım. Bana soru sorarlar, ben de konuyu gerçekten öğrenmiş miyim onu anlarım. Son zamanlarda*

arkadaşlar bana integral ile ilgili sorular soruyorlar. Ben de çözebililiyorum bu da iyi hissettiriyor kendimi.] (Student 2)

> I am terrible at memorizing things. My friends helped me to solve this problem. I was about to give up studying, but one of my friends told me that she is studying while walking and this helps her remember better. Then we started to walk together and we revised the topics while walking. I can say that this has saved me. I have kept studying thanks to my friend. [Ben bir şeyleri ezberlemede çok çok kötüyüm. Arkadaşlarım yardım ettiler bu sorunu çözmemde. Artık çalışmaktan vazgeçmek üzereydim, ama bir arkadaşım yürüyerek çalışırsan daha iyi hatırlarsın dedin. O o şekilde yapıyormış. Sonra beraber yürümeye başladık. Yürürken de konuları tekrar ettik. Bu beni kurtardı diyebilirim. Arkadaşım sayesinde çalışmaya devam ettim.] (Student 11)

All in all, the analysis of both the student and teacher interviews uncovered that peers are a major triggering factor for the maintenances of SRL. As seen in the interviews, SRL is not a characteristic that automatically stays with the learner. It has to be renewed or brushed up so that the learner keeps performing SRL. As seen in the analysis of the interviews, the students have developed SRL strategies at an early age. However, SRL performance has its ups and downs as the years goes by yet the interviews with the students showed that strong cooperation with the peers is the major element which helps students preserve their SRL strategies and even enrich them. As the students are able to help one another better by providing role models or inspirations or giving one another a variety of learning strategies, they actually feed the feelings of self-efficacy in one another and prevent feeling of helplessness. This enables them to regulate their learning process.

4.5.5. Individual Factors

There were some individual factors mentioned by the teachers and students which contribute to the development of SRL. One factor suggested by the teachers is *critical thinking skills*. Some teachers (*f*=2) expressed that students who have developed better critical thinking skills regulate their lives better. They are able to critically analyze the academic subjects as well as what is happening in their lives. For this reason, they can make better judgements and plan their lives better:

> Some students have great critical thinking skills. They are much better than the others in terms of organizing their lives. They have high awareness of their responsibilities. They act accordingly. [*Bazı öğrencilerimizin muazzam*

eleştirel düşünme yetenekleri var. Bu çocuklar hayatlarını planlamada çok daha iyiler. Sorumluluklarının gayet farkındalar, buna göre de davranıyorlar.] (Teacher 1)

> In my opinion, the students who are critically analyzing subjects rather than memorizing are much better in terms of managing their time and dealing with the questions. Obviously, these students started to question things I mean they were given a chance to question things at an early age. Now, they can make better choices. [*Benim görüşüme göre konuların kritiğini yaparak analiz eden öğrenciler ezberleyenlerdense gerek zaman planlaması olsun gerek soru çözümü olsun çok daha iyi yapıyor. Açıkça belli bu öğrenciler küçük yaştan itibaren sorgulamışlar yani buna izin verilmiş*. *Şimdi de daha iyi seçimler yapabiliyorlar*.](Teacher 9)

Thus, some teachers (*f*=2) underscored that developing critical thinking skills is an essential factor in SRL process. Because the students who have better critical thinking skills can analyze subjects better, they are able to make better decisions and act on them. This helps them to manage the SRL process more efficiently than the others.

Last but not least, *self- efficacy beliefs* have been suggested as a fundamental factor promoting the development of SRL. Both teachers and students indicated that when the learners believe that they can achieve a task, they are more likely to work on it. Teachers stated that self-efficacy is an area that they particularly worked on, while the students stated that when they see that they can succeed, they study more, which is a process that takes place gradually. Some of the students (*f*=6) even stated that they are well aware of the fact that if they feel confident about succeeding in something, they can study harder and then become really successful in it. For this reason, they are working on increasing their self-efficacy. Self-efficacy has been indicated as the starting point of the SRL process. Thus it can be emphasized that the self-efficacy beliefs are a key determining individual factor in the SRL process:

> Math is my favorite course and I like it because I think I can do it very well. [*En sevdiğim ders matematik. Matematiği seviyorum çünkü bence çok iyi yapabiliyorum.*] (Student 14)

> Since my childhood, I have been good at Math. That is why it is my favorite course. All those calculations and Geometrical shapes makes me feel very smart. I can learn Math the topics very fast, so I listen to my teacher very attentively. I draw lines. I find equations. I solve problems. I feel very good about myself. [*Çocukluğumdan beri matematikte iyiyim. Bu yüzden de benim en sevdiğim ders matematik. Bütün o hesaplamalar geometrik şekiller kendimi*

zeki hissettiriyor. Matematik konularını hızlıca öğrenebiliyorum, o yüzden de öğretmenimi çok dikkatli dinlerim.] (Student 11)

I have been studying daily since the beginning of the 10th grade. This is something related to self-confidence as well. When I see that I can do it, I become more interested in it. When I learn more about that subject, I do it better. This is a positive cycle. [*10. Sınıfın başından ber günlük çalışıyorum. Bu benim özgüvenimle de ilgili bir şey. Yapabileceğimi görünce daha da ilgileniyorum o konuyla. Daha çok öğrendiğim zaman da daha iyi yapıyorum. Bu böyle pozitif bir döngü.*] (Student 4)

I have learned many terms of Chemistry with the help of a TUBİTAK project. I knew the periodic table and some chemical reactions earlier than my friends. This has boosted my self-confidence. Then I have realized that I can learn well and so I studied harder. [*Ben bir TUBİTAK projesi aracılığı ile bir sürü Kimya terimi öğrendim. Periyodik tabloyu ve bazı kimyasal tepkimeleri ben arkadaşlarımdan önce biliyordum. Bu benim özgüvenimi arttırdı. Sıkı çalışırsam çok iyi öğrenebileceğimi anladım*.] (Student 10)

I believe everything is easier if you have self-confidence. If you are aware of the fact that you can somehow understand that the topic, you study harder because that belief pushes you to study. I have been very good at Math since primary school. I have self-confidence. I enjoy studying it. Thus, I can do it very well. [*Bence özgüveniniz varsa her şey daha kolay oluyor. Eğer mesela konuyu bir şekilde anlayabileceğinizin farkındaysanız daha sıkı çalışıyorsunuz çünkü bu inanç size çalışmaya itiyor. Ben ilkokuldan beri matematikte çok iyiyim. Matematik çalışmaktan zevk alırım. O yüzden de çok iyi yaparım.]* (Student 5)

The analysis of the student interviews also showed that while self-efficacy beliefs trigger the SRL process, lower self-efficacy can hinder SRL and might lead to failure:

I feel really nervous about Physics exams. I am not able to solve Physics problems. This is a vicious cycle I think. I studied, but I could not do it. As I could not become successful, I got more and more upset and decreased the time that I spent on Physics. Then I could not do it at all. Now I am a failure in Physics. [*Fizik sınavlarında çok geriliyorum. Fizik problemlerini çözemiyorum. Bu bir kısır döngü bence. Çalıştım yapamadım. Yapamadığım için de gittikçe daha da üzüldüm sonra da Fiziğe ayırdığım zamanı azalttım. Sonra da hiç yapamadım. Şu anda tam bir fiyaskoyum Fizikte*.] (Student 13)

I do not have the essential knowledge of English grammar. I studied at a state school till 5th grade and I was very unlucky about English. I did not have any good teacher of English. Everybody was better than me and teachers were teaching considering their level of English. I have never been able to learn English so far. I think I cannot learn a foreign language. I cannot learn German either. I can never understand the structure of grammar. [*Benim İngilizce*

temelim yok. Beşinci sınıfa kadar devlet okulunda okudum ben İngilizce konusunda çok talihsizdim. Hiç iyi bir İngilizce öğretmenim olmadı. Herkes benden daha iyiydi ve öğretmenler onların seviyesine göre ders yapıyordu. Şu ana kdar İngilizce öğrenemedim. Bence ben yabancı bir dil öğrenemem. Almanca da öğrenemem. Gramer yapısını hiç anlayamıyorum.] (Student 5)

Geography is my nightmare. I do not study as I feel scared of being unable to learn and then I do not study at all. [*Benim kâbusum Coğrafya. Öğrenemeyeceğimden korktuğum için çalışamıyorum. Sonra da toptan çalışmıyorum.*] (Student 12)

Considering the quotes above, it is appropriate to conclude that if students believe that they have what it takes to be successful in a school subject, they can easily regulate their actions and study hard on that subject. On the other hand, if they have negative feelings related to a school subject and if they believe that they cannot succeed even if they try, they close the door to the SRL process and they are unable to make the effort to be successful. This blocks the SRL process.

4.6. Summary of the Results

Considering the aim and the research questions of the present study, the results of the study were presented under five headings. In the first part, the SRL strategies that the students studying at the top ranking science high schools of utilize have been shared. The results of the current study showed that these students all set goals. While some of these goals are related to their future career, some other goals are concerned with today. They set goals related to the tasks that they need to complete daily, weekly, and monthly or during specific holidays. It has also been determined that the students not only set goals, but also figure out ways to reach those goals. They strategically plan their moves to achieve such goals. They decide on what to learn beforehand and make a to-do list. Within their planning, they also plan their lives and what to do at certain times or the length of the activities that they are going to do both social ones and academic ones. In order to follow this plan, they exercise a great amount of self-control. They are able to motivate themselves. They find a way to do what is necessary to reach their goal even though they do not feel like doing it. They orient themselves to the task at hand. They develop an awareness of the distractions, but find strategies to overcome those. In all these strategies, the students actively take the control of their own learning. They do not blame other people for their acts or they do not expect other

people to regulate their behavior. They take the responsibility and act with this sense of responsibility.

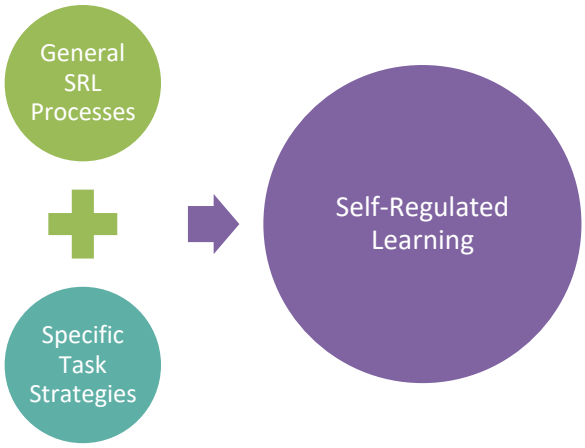
Also, once they orient themselves for the task, they arrange the environment. Both the scale administered to the students and the student interviews indicated that environmental organization is a vital SRL strategy for the students. They keep the distractors away, turn off the TV if there is one, prepare the sources they are going to use, and then they start to study. Some of the students even pointed out that they arrange their clothes too as they need to wear comfortable clothes while studying.

In addition, both while they are listening to their teachers and studying on their own, the students employ certain strategies to focus on learning better. The strategies that they employ so as to learn better in class include checking the units of that week earlier, listening to the teacher attentively without being distracted by anything else and sitting in a good place in the class so as to be able to listen to the teacher carefully. Also, there are strategies that the students utilize while studying such as starting with relatively easier subjects, starting with a subject that they like, and not allowing themselves to be distracted by any thoughts and trying to stay in the moment. Besides, activating prior knowledge has been stated as a strategy which the students employ a lot. They often revise the topics they have covered earlier and check what they already know. They underlined that this strategy enable them to complete the planned tasks faster. In addition to activating prior knowledge, the students employ several task strategies so as to study more efficiently and overcome the possible problems. It was reported by the students that they experiment various task strategies and keep the ones that they believe useful. They evaluate themselves by answering some multiple choice questions on that subject or through their exams. The task strategies reported by the students were incompatible with the results of the SRSS and they include contemplating the method of studying and the content beforehand and making a plan, wielding different sources, highlighting key information often with a colorful pen, taking notes of essential information, making a summary of the topic with their sentences. In addition, the students underlined that they do not let themselves be drown into helplessness. They get help from their peers, teachers and particularly YouTube videos when necessary.

Thus, the first research question shed light on the SRL strategies employed by the students. Thus, it was possible to elaborate on the SRL process of the students studying at the top ranking science high schools of Türkiye. The second research question of the study explored whether SRL learning is domain specific or it is a general concept. The results of the study showed that SRL is both. To elaborate, SRL process is a general concept that is valid across the subjects because the students go through forethought, performance and self-reflection processes for each lesson. However, is also a domain specific process because the strategies they employ from one academic subject to another. To exemplify, while they are focusing on solving more and more complex problems in Math, they focus on mastering the content in history. They study benefiting from shapes in biology. Figure 7 illustrates the nature of SRL:

Figure 7

Nature of SRL



Thus, the results of the study indicated that SRL has both general and domain specific elements in its nature.

What is more, the present study investigated the beliefs of teachers on self-regulated learning as this is a key point to uncover if they play an important role in promoting SRL for their students considering the "practice what you preach" principle. The results of the study showed that the teachers have sufficient knowledge of SRL and they strongly associate SRL and academic success and emphasize that SRL learning

should be realized in high school. The only question mark indicated by the teachers is the one about giving students the responsibility to manage their own learning process and the content to be learned. Some teachers pointed out that this can be only possible if, first, the students are trained to regulate their own behavior or learning process without an external authority. This is because some students are great learners when they are externally manipulated, but they have some difficulty if they are left to their own device. Thus, in a way, they put forward the significance of training students to be internally self-regulated while they are stressing the importance of SRL in high school.

Last but not least, the present study investigated the instruction related and student related factors promoting the SRL strategies of students. According to the students, their primary school teacher was the main instructional reason for why they were self-regulated. All the students emphasized that their primary school teacher played a crucial role in their lives and taught them how to organize their lives. They all underlined that their primary school teachers were idealistic and caring. Primary school teachers achieved that with the help of certain methods such as assigning various homework, helping them to create study schedules or rewarding them. The students also indicated that their middle school teachers helped them to develop various SRL strategies and their science high school teachers helped them to maintain their SRL strategies and taught them new ones. In addition, the interviews conducted with the teachers revealed certain instructional factors aimed to promote SRL among students. To elaborate, the teachers stated various activities that they do so as to promote SRL strategies of the students. They do these either during the breaks or after school or during their lessons. They teach time management skills to their students to help them use time more efficiently. They pay attention to the progress that their students make and they keep the record of this. They teach their students task strategies to enable them to study more efficiently. Besides, they show efforts to build a positive interaction with their students. These efforts are shown to make learning process interesting and fun for the students so that they and learn better and carry on learning after school. Besides, the teachers generate interest among students by asking them

thought-provoking questions and by linking the class content with real life. These methods are part of the instruction aimed to help students develop SRL skills.

When it comes to the student related factors promoting the SRL strategies of students, both teachers and students set forth several factors positively impacting the development of the SRL process. To elaborate, there is a range of student related factors affecting the development of SRL skills. Among them, parents and peers are the ones which were emphasized the most by the participants of the study. Bot teachers and students suggested that parents have a serious impact on the development of SRL. The students elaborated on this by stating that their parents encouraged them to regulate themselves by teaching them how to do so. They also motivated them to regulate their behavior. Besides, they taught various task strategies to their children. In addition, peers were reported to have a big impact on the SRL development. It has been revealed in the present research that the most self-regulated students are the ones who cooperate with their peers in their learning process. They learn task strategies and SRL skills from each other, which enables them to attain their goals without being stuck in the feeling of helplessness.

To put in a nutshell, the present study presented an analysis of the SRL strategies employed by the ranking science high schools of Türkiye as well as student related and instructional factors affecting the development of such strategies. What is more, it provided a contribution to the discussion related to SRL's being a general or domain-specific concept by elaborating on the nature of the SRL process. Last but not least, it revealed the SRL related beliefs of teachers working at the top ranking science high schools of Türkiye.

CHAPTER 5

DISCUSSION

Considering the research questions of the present study, this chapter offers the discussion of the results in the light of relevant the literature under four sections: the SRL strategies employed by successful students as well as the domain specific and general features of these strategies, SRL related beliefs of teachers, instructional factors affecting the development of SRL strategies and student related factors promoting the development of SRL strategies. Once the results are discussed, implications for practice and suggestions for the future studies are also presented.

In line with the research questions addressed in the present study, data were collected from the top ranking science high schools of Türkiye determined by a competitive national exam. The data of the first research question investigating SRL strategies of the students were collected through both interviews with students and SSRS. The interviews were analyzed via content analysis method while the frequencies of SRSS were determined. The question exploring the domain specificity of SRL was addressed with the help of the content analysis of the student interviews. The beliefs of teachers were revealed by analyzing the interviews of teachers through content analysis and obtaining the frequencies of SRLTB. In addition, instructional and student related factors promoting SRL were determined through content analysis of teacher and student interviews. Thus, the results of the data collection were shared in the previous chapter. Based on the analysis of the data, the discussion of the results is given for each research question exclusively.

5.1. The SRL Strategies Employed by the Students Studying at the Top Ranking High Schools of Türkiye

Concerning the SRL strategies employed by the students studying at the top ranking high schools of Türkiye, the results of the SRSS and student interviews indicated that the students employ a range of SRL strategies. Considering the sample of the present study, it can be indicated that these strategies have the great potential to carry the students to success as they are employed by academically very successful students. First of all, *goal setting* was found to be a strategy that is employed by all the students, so it can be described as a fundamental strategy. *Goal setting* can be defined as the starting point of all other strategies mentioned in this study. *Goal setting,* which can be defined as students' initiated efforts in creating educational goals or sub-goals to attain, is a strategy that is often employed by the students. This goal can be about their future career, reaching mastery in a field, or completing a task in a relatively shorter period. This is in line with what Zimmerman (2013) indicated within his model of self-regulation. *Goal setting* is a part of the forethought process of self-regulation and it has been regarded as the beginning of the self-regulation process as the learners regulate their acts so as to attain a certain goal. The results of the present study showed that the students want to study at a good university or get high grades from exams. They also want to improve their academic knowledge so as to be successful in the university entrance exam. That lays the foundation for their SRL process. Once the students set a certain goal, they manage their time and resources so as to reach this goal. At this point, it is also essential to highlight that the students set their goals with *multiple motivational beliefs* in their minds. To elaborate, they have strong reasons to set these goals. They have more than one rationale or justification to achieve that goal. For example, they do not just want to become a doctor because it is a respectable job. They want to become a doctor because it is a highly respectable job which fits into their talents and interests, and they intend to receive a high income from this profession, and also they want to contribute to science. This tells us that goal setting only is not what these students do. They set these goals with strong bases creating more reasons to self-regulate.

With this purpose in mind, they *strategically plan* their steps and create study programs to organize their life. This finding matches with what Pintrich (2005) stated a as a process of student's initiated efforts in ordering and allocating time slots to fulfill their goals. This process also includes determining the requirements of the task to complete and managing time effectively. Both the analysis of SRSS and students' interviews indicated that the students *strategically plan* their steps to achieve a certain goal and make a study schedule with this purpose in mind. With these findings, it is possible to infer that setting a goal with a range of inspirations and developing plans to fulfill that goal are two respective steps in SRL process which initiates the self-regulation process of high achievers. These are the steps that start and trigger students' acts of SRL. Once the students go through these processes, they are able to shape the rest of the SRL process.

The next SRL strategy revealed by the present study belongs to the performance phase of Zimmerman model (1994). Within the framework of the performance phase, *self-control* has been uncovered as a key SRL strategy as a result of the data analysis of the present study. This strategy can be defined as a student-initiated efforts to employ certain SRL strategies to complete a task. During the student interviews, it has been reported that the students motivate themselves and control their emotions so as to start studying or listening to their teachers even in times when they do not fancy doing it. As stated by Corno and Mandinach (2004), learning is believed to involve its own reward, and "studenting" includes the completion of many tasks which are to be proven beneficial ultimately, but this whole job of fulfilling the responsibilities of a learner is not always amiable. In this with this idea, the key point in self-control process is the individuals' competency to take actions against their immediate desires (Hofmann et al., 2012; Letzring et al., 2005). Gross (1998) states that there are five kinds of tactics that enable learners to shape their SRL process by controlling their emotions and acts which are situation selection, situation modification, attentional deployment, cognitive change, and response modulation. Learners go through these stages so as to regulate their emotions and control behavior. The present study supports the theory of Duckworth et al. (2014) as learners particularly find an appropriate place to study which can be defined as situation selection. If they feel the need to organize the

environment, they modify the situation. They turn off the TV and put the distractors away while organizing their sources as efficiently as possible. They utilize particular strategies to focus their attention on the content despite the urge to procrastinate, which can be defined as attentional deployment. They work on cognitive change by filling in the gaps in their knowledge and perform response modulation by working on the feelings of boredom and fatigue and replacing them with the satisfaction of completing their agenda. All these processes require a great deal of *self-control*, so as De Ridder et al. (2012) states *self-control* process is quintessential. Self-control is considered a key component of self-regulated learning, as it enables individuals to *orient themselves to the learning task* and persist in their efforts despite obstacles and distractions. These findings in the literature are compatible with the findings of the present study since the participants of the study underlined that they show special efforts to control their acts to keep on learning. What is surprising and also interesting about this result is that *self-control* seems to be taking place automatically to many people and it is often believed that people either have self-control or lack self-control. However, the results of the present study showed that *self-control* is not a trait; it is a process that is built. These students, who can be rightfully defined as high achievers, employ strategies to perform self-control. They struggle to have self-control day by day and they employ another strategy if they feel that they are losing self-control. They utilize certain strategies to keep controlling themselves. What is also striking about the results of the study is that the students did not mention hard feelings of boredom, fatigue, or helplessness while they were describing their SRL process. It was obvious that rather than getting caught in negative feelings, they were focusing on strategies to manage the SRL process. They did not mention the feeling of helplessness, mostly because they were strongly cooperating with their friends. They did not mention how exhausted they were because they needed to do self-regulation all the time. Instead, their replies focused on their goals and their sources of motivation to achieve these goals. What is more, they excelled at certain *task strategies* to manage the self-regulation process, so they did not mention being stuck at certain points or feeling hopeless about their success. They were regulating their emotions as well as behaviors and an obvious *self-control* mechanism was present. For this reason, *self-control* has been determined as a self-regulation strategy which shapes all the processes. With the help of the self-control

strategy, students *orient themselves for the task*. In their theoretical model, Tabachnick et al. (2008) underline that intrinsic and extrinsic goals set for the future make students determine a middle-range sub goal. This sub goal enables students to perceive task instrumentality. In turn, perceived task instrumentality leads to the proximal task orientation stage of the SRL process. This includes perceiving distractions but not being flown by them so as to go one step further towards the goal. The results of the study justified this finding of Tabachnick et al. (2008) as the students state that they control themselves to start the task completion process at hand by employing task orientation strategies. They mostly follow a certain routine which enables them to regulate their acts and achieve task orientation. Furthermore, there is another point to highlight in this process. The students *take responsibility for their own learning* and manage such processes on their own, which a factor is helping them to self-regulate. The analysis of the data of the present study showed that the students believe that they are the ones who should struggle to regulate their acts as they are the ones who own the future goals. As a result of the self-control process, self-regulated learners take responsibility for their own training process and take action accordingly. Taking personal responsibility has been broadly researched in the literature (Bandura, 1993; Cook-Sather & Luz, 2015; Kohns & Ponton, 2006). As underlined by Jiusto and DiBiasio (2006), feeling responsible for one's own learning involves many processes, like overcoming challenges or dealing with possible problems. Thus, it helps individuals to develop certain skills, increase self-esteem, and feel ownership for the consequences of their acts as well as their success and failure. As it is also revealed in the present study, because students are conscientious, they feel the need to pull themselves together and act, which creates the process of self-regulation. The results of the present study indicated that self-regulated learners have a great sense of responsibility for their own learning. They take full responsibility for their acts, and they prefer to act rather than wait. This result also matches the essential components of the definition of self-regulation presented by Winne (1995), who underlined that self-regulated learning is innately productive and self-directed. This can only be possible if the process of learning is governed by the learner who feels responsible.

As stated earlier, self-regulated learners take over the responsibility of learning, and this also involves arranging the physical environment so that they can study efficiently. *Environmental structuring* is a SRL strategy that has been emphasized in research (Zimmerman and Pons, 1986). This strategy can be described as the efforts of the learners to organize the physical environment to facilitate the learning process. Consistent with the results of the present study, many other studies state that structuring the environment is a fundamental component of the SRL process (e.g., Ning & Downing, 2012; Winne & Marzouk, 2019). This might include keeping the distractors away, such as turning off the TV or turning on the airplane mode of the cell phones. The present study showed that academically successful students often have their own style of organizing the physical environment. This is a must for them to focus their attention and organize their studying process. This might also include finding a suitable place to study, organizing the resources to be applied so as to reach them quickly if need be, wearing comfortable clothes, and tidying the other things around the study area. Thus, students who are successfully regulating their learning process set the stage to ensure the smoothness of the process. Besides, structuring the environment actually plays the role of a transition to the studying process and starts the attention-focusing process.

Attention focusing can be regarded as a natural process of learning, but giving a considerable amount of deliberate effort on something requires special effort. *Attention focusing* which is portrayed as student-initiated efforts of utilizing a range of learning tactics to attain the preset goals by Zimmerman (2013), has appeared as a fundamental SRL strategy. Cleary (2018) presents an overall evaluation of this matter in his book and underlines that attention focusing is not an activity that occurs naturally once the students intend to learn. The learners need to learn "the language of strategies" so as to concentrate on learning. Similarly, the findings of the present study suggest that attention focusing does not just occur "naturally." The students understand the difficulty in focusing their attention on something, and so they employ a range of strategies to ease the process. The students utilize SRL strategies both to focus their attention during the class and while studying. Sitting in a strategic place in the classroom, previewing the subjects of the lessons before the lessons, and note taking

are some attention focusing strategies employed by self-regulated students during instruction. Besides, starting studying with a favorable subject, staying in that moment, and clearing the mind before starting to study are some attention focusing tactics employed by self-regulated learning while they are studying. Thus, it is appropriate to conclude that self-regulated students make preparations to be able to concentration better and they do not expect attention focusing to occur automatically.

Once the learners manage to concentrate, the results of this study suggest that very often, the first thing they do is *prior content knowledge activation*. This strategy helps the students make an evaluation of what they already know on the subject, and it enables them to link the new information with the already existing one, which is seen as a key learning strategy (Mayer, 2003) and also highlighted as a SRL strategy by Zimmerman and Schunk (2011). This strategy is highlighted as a key element of the SRL process by both teachers and students since it enables them to build connections between previous instruction and new content. It also supplies them with a framework to better comprehend new content. As stated by Pressley and Hilden (2006), *activating prior content* sets the stage in the memory for upcoming information and eases to maintain the SRL process. This strategy enables learners to do so in three different ways. First, it makes the coding process easier, so learners can learn in bigger chunks rather than small bits and pieces. Second, it helps the learner create stronger mental connections between knowledge. Third, this strategy helps the learner in the decision making process as they can make a better selection of useful and less useful strategies of learning. Because this strategy helps the learners handle the learning tasks, it facilitates the SRL process as students are able to keep regulating their behavior without feeling stuck or being overwhelmed by the new information they are supposed to learn. This strategy was also underlined by the teachers. Teachers reported utilizing this method very often in their classes. For this reason, it would be appropriate to conclude that teachers set a role model for their students for the use of prior content knowledge activation.

The findings of the present study also showed that once the learners activate their prior knowledge, they use a range of task strategies to carry out the SRL process. Research has shown positive relationships between the use of SRL task strategies and academic

outcomes in learning settings (Beishuizen & Steffens, 2011; Dignath & Buttner, 2008; Pintrich, 2005; Richardson et al., 2012; Zimmerman, 2005). Zimmerman (2013) defined these task strategies as endeavors that are initiated by learners to utilize several learning tactics to attain the learning goals. The findings of the present study suggested that self-regulated learners start to use task strategies at an early age, and they *self-experiment* with these strategies. Experimenting with diverse methods of comprehension has been detected as a sign of self-regulated learning by Rothbart and Jones (1998), too, as they are performed without the intervention of teachers or any external body. Learners try the methods and keep only the most useful and practical ones and make amendments to the way that they use such strategies until they reach the optimum way of using these strategies. This process has been described as metacognitive monitoring by Zimmerman (2013). Metacognitive monitoring can be described as the efforts of the students to keep track of their own learning in their mind, giving feedback to themselves and arranging the next step accordingly. The participants of the present study indicated that they create reports of their learning strategies in their mind, and keep the useful ones for their future processes while discarding the least useful ones. Thus, they can take an adaptive or defensive action toward a learning strategy. This justifies the metacognitive process of the self-regulated learners to monitor their acts. The findings of the study justified this process as the students expressed that they keep creating specific definitions of useful and less useful task strategies in their minds during their SRL process, which is a vital element of the system they created to regulate their acts.

As stated earlier, the participants of the study declared that after they filtered some task strategies following their experiments with them, they chose the most useful ones for them. The criteria to determine the most useful ones are the practicality and efficiency for them. To illustrate, *making a to-do list* has been underlined by participants as it helps the learners use their time efficiently. Time management has been underscored as an essential part of SRL, as also put forward by Pintrich (2004). Pintrich (2004) stated that the efforts of the learners to order and allocate time slots to their learning as well as other activities so as to manage and use time efficiently to achieve their goals. The present study found that self-regulated learners show a great

effort to manage their time and organize their lives around the goals and sub goals they set. They create to-do lists and assign time slots to each learning task which sets the platform to regulate their acts. Additionally, *benefitting from different sources, underlining the important parts, and taking and revising notes* are some task strategies underlined by the participants. These task strategies are in line with the findings presented by Zimmerman (2013) and Pintrich (2004). However, the findings of the present study brought forward two more important implications than the names of the task strategies which were cited before. First, although these task strategies seem to be simple, the students use them in complicated ways. That is, they have a very detailed way of using these strategies which actually facilitates their SRL process. When they make a to-do list, this also includes the method of learning which change depending on the nature of the course. When they use multiple sources, they have a clear rationale for using that specific source or when they underline certain parts, they do it systematically rather than randomly underlining some parts to keep studying. There is a specific explanation for each part they underline. In addition, they have a precise and orderly style of taking and revising notes. Thus, this tells us that not the strategies themselves but the way that the students tailored the strategies conscientiously considering their learning needs makes the difference in terms of facilitating the SRL process. Second, these students use multiple strategies effectively at the same time to attain their goals. They do not stick to one strategy but employ a different one considering the requirements of particular courses. This is one of the essential things that assist their SRL process, also indicated by Banarjee and Kumar (2014).

Moreover, because participants of the study emphasized that they keep learning on their own with the help of these task strategies, the use of these strategies can also be evaluated as a part of self-instruction. Rothbart and Jones (1998) also reached the same conclusion as self-instruction is the process when the actual learning takes place with the efforts initiated by the learner, which makes it a distinctive part of self-regulation process. Besides, self-instruction involves employing various strategies to achieve the learning task at hand, such as finding alternative methods to learn and using different sources. Thus, we can conclude that the use of task strategies helps learners to achieve self-instruction, making them independent and self-regulated learners.

Another essential finding of the present study is that the self-regulation process can be greatly facilitated through cooperation. *Help seeking* was revealed as a significant SRL strategy by Zimmerman (2013) and the findings of the present study showed that self-regulated learners are only able to maintain their self-regulation by getting help from their peers, teachers, or the internet. Among them, cooperating with peers to carry on learning and benefiting from the YouTube videos have been emphasized the most. Self-regulated learners do not let themselves drown in the feeling of helplessness. They get help from their peers or the internet as well as their teacher though getting help from the teachers does not take place very often. Peer learning has been highlighted in the literature as an influential factor in the learning process, but the present study showed that it is also crucial in self-regulation process. Peer learning, also known as collaborative learning or cooperative learning, can be defined as a learning process in which students work together in small groups to achieve certain learning goals, and learn from one another. The concept of peer learning has been extensively researched in the fields of education and psychology, and has been found to have many benefits for students, including increased motivation, improved achievement, and greater social and emotional skills. This study suggests that peer learning has a positive impact on self-regulated learning process as well. The learners seek help from their peers as they state that peers can explain in a simpler way and so it is much easier to learn from their peers. This also tells us that self-regulation has a social aspect. One of the key findings in the literature on peer learning is that students who participate in peer learning activities tend to perform better academically than those who do not. This has been attributed to the fact that peers can provide valuable feedback and support to one another, and can encourage each other to work harder and stay focused greatly contributes to the SRL process. What is more, peer learning activities can promote social and emotional skills such as cooperation, communication, and teamwork, which are critical for success in both academic and non-academic settings (Hogan & Tudge, 1999; Boud & Cohen, 2014). Besides, peer learning activities have been found to be particularly effective for students as peers can provide individualized support and feedback that is tailored to their needs, which is also justified in the present study. The students have underlined that their peers are there whenever they need help to provide tailor fit instruction. Thus, in line with the findings of the previous studies, this

research suggests that peer collaboration does not only facilitate the learning process but it also helps learners to maintain SRL skills.

Another interesting finding of the present study was the *help of YouTube* videos. The students reported benefiting from YouTube videos extensively as they are available regardless of time and place. They also underlined that YouTube videos are particularly useful since learners are able to slow down the speaker or replay it as they like. Many participants expressed that they started to use these videos during the Covid19 pandemic. Such use of technology contributes to self-regulation, making the students more independent. This finding tells us that with the developments in technology and as a result of the new trends, the process and the contributors of the SRL process change, too. This reveals the importance of doing SRL research on a regular basis, as the contributors to the process obviously get transformed.

One of the most striking results of the present study is how *self-evaluation* feeds the other processes of self-evaluation. Schunk (1996) underlines that periodical *self-evaluation* is a key process in SRL. It can be described as the self-made reactions to the performance of a learner. Self-evaluation enables individuals to monitor their progress, identify strengths and weaknesses, and adjust their learning strategies as needed. The literature on self-evaluation strategies in SRL has focused on understanding the functions of *self-evaluation*, the factors that influence its use, and their impact on learning outcomes. Self-evaluation has been found to be an effective strategy for promoting SRL as it helps individuals to reflect on their own performance and identify areas for improvement (Clearly & Zimmerman, 2002; Kitsantas et al., 2004; Kitsantas & Zimmerman, 1998; Schunk, 1995). This evaluation can be a social or individual process. The students can compare their performances with one another and so evaluate themselves, or they can use extra sources to do this, like exams or tests. This SRL strategy has been reported as the filter of the SRL strategies as the learners have stated that they make informed decisions related to the future SRL strategies that they are going to utilize based on such evaluations. Thus, the present study suggested that *self-evaluation* continuously shapes the other processes of SRL.

All in all, the present study conducted with academically successful students revealed that such students actively regulate their behavior by taking responsibility for their education. Studies conducted so far show that students who are mentally active during learning rather than being passive receivers of instruction and make use of a large degree of control over the attainment of their goals regulate their acts to achieve this (Pintrich & Schrauben, 1992) and the results of the present study are in line with the literature. They set goals and strategically plan to achieve these goals. They manage time and apply several tactics to complete the learning tasks. The stages of SRL are intertwined, and it is not linear, as also acknowledged by several previous studies (e.g., Wolters et al., 2005). The process starts with setting goals with the help of multiple motivational beliefs. Once a learner sets the goals, s/he starts to make strategic plans. Once the learners decide to take responsibility for their own learning without expecting to be trained by other people, the active process of SRL starts. The previous processes are mental ones, while task orientation, environmental organization, attention focusing, activating prior knowledge, and use of task strategies are the ones in which the learner actively takes steps to attain learning goals. In other words, they are cognitive, metacognitive, and behavioral processes (Pintrich and De Groot, 1990; Pressley et al., 1989; Vanderstoep et al., 1996; Zimmerman, 1989, 1995). Finally, it is important to note that several stages can take place at the same time. All the stages feed and shape one another. However, the self-evaluation process is the one that feeds and modifies all the other processes.

For a final note, it is important to highlight that the SRL strategies employed by academically successful students are not totally new. These are tactics unknown to other people. However, the present study showed that these students who are highly self-regulated and academically successful use SRL strategies concurrently in an effective way. What makes them uniquely regulated is that rather than getting caught by negative feelings, they apply multiple methods to complete the task at hand. They do not hesitate to seek help or change the method if it is not working. They apply specific methods to achieve each stage of self-regulation, such as task orientation or attention focusing. This makes the main difference for them since they meticulously work to keep regulating their behavior and attain their goals.

5.2. Self-Regulated Learning as a General or Domain Specific Concept

One focus of this study was investigating the domain specificity of self-regulation. It is possible to state that the research on the nature of the self-regulation is diverse. To elaborate, there are several models of SRL which deals with SRL as a general concept. Zimmerman (2005) presents a cyclical model which describes the self-regulation process in general without making differences between academic subjects. Forethought, performance or volitional control, and self-reflection processes are cyclical and valid through academic subjects. Similarly, Winne and Hadwin (1998) point out that conditions, operations, products, evaluations, and standards are SRL processes that take place in general throughout the SRL processes. In this recursive model, each stage is provided with feedback. The model focuses on the nature of SRL in general rather than differentiating between the academic subjects. In the same way, Pintrich (2005), forethought, planning, activation, monitoring, control, reaction, and reflection stages take place regardless of the academic subject.

However, recent studies have been making a distinction between academic subjects in terms of SRL strategies. Since Alexander et al. (2011) made a call to publish more research on domain-specific aspects of SRL, there have been several research studies dealing with this topic. In their study, Poitras and Lajoie (2013) present a domain-specific account of self-regulated learning dealing with SRL with historical inquiry. In their study, they deal with the domain-specific features of SRL in the course of history, examining several tasks such as text-studying and problem-solving. In their model of cognitive and metacognitive activities in historical inquiry (CMHI), they underline the domain-specific nature of SRL and state that many dimensions of SRL change depending on the subject. However, they also acknowledge that there are shared elements of SRL that go beyond the differences of the subjects.

To elaborate, there is evidence in research that metacognitive activities are shaped depending on the domain, such as Math, History, or Science (Schraw, 2006; Shanahan, 2009; Van der Stel & Veenman, 2010; Veenman, 2005). Meijer et al. (2006) pointed out that 60% of the categories in their taxonomy of metacognitive activities are pertinent to the tasks of Physics and History at the same time, but still, they were

inherently different in terms of the domain and the nature of the task that required the employment of metacognitive activities. Besides, learners might do the same metacognitive activities before learning Physics or History, but while they are studying history, they struggle to comprehend difficult texts or create links between the events, and they make calculations in Physics. This takes us to a premise put forward by several researchers (e.g., Winne, 2001, 2005; Winne & Hadwin, 1998, 2008, 2010) which tells that learners organize their learning via an iterative and adaptive process through which cognitive and metacognitive activities interact. Similarly, as Van Drie and van Boxtel (2008) point out, learning takes place in the context of completing authentic tasks in the pertinent subject matter. Thus, the research shows that there is a domain-specific element in the SRL process, which is impossible to ignore. In her model, Boekaerts (1992, 1995, 1996a, 1996b) recognizes the domain-specific aspect of SRL and divides self-regulation into six elements, namely domain-specific knowledge and skills, cognitive strategies, cognitive self-regulatory strategies, motivational beliefs and theory of mind, motivation strategies, and motivational self-regulatory strategies. The present study acknowledges this domain-specific element of the SRL process and also the general processes of SRL, which are inherent in various academic subjects. The results of the present study showed that the students set goals for the distant future and for the immediate future. They strategically plan for both of them. They control themselves to take action to learn. They organize the environment, focus their attention, and activate prior content. They go through such stages regardless of the subject matter, and they feed each stage with a kind of self-evaluation activity. However, when it comes to the task strategies they employ in different academic subjects are distinct. While they take notes, revise their notes, or summarize the key points in courses like literature or History, they solve complex problems in Math or Physics. They tend to study individually in courses like social sciences or literature, but they cooperate and study together with their peers in academic subjects like Math or Physics. Thus, it is possible to conclude that they go through similar stages of SRL, but they utilize distinct task strategies to learn different academic subjects. This takes us to the conclusion that SRL has several components. Many of these components are general, and the learners go through these paths no matter what they study. However,

because the process of learning requires the completion of tasks particular to different courses, the SRL process has various domain-specific aspects.

5.3. Beliefs of Teachers on Self-Regulated Learning

In the literature, there is a considerable amount of research signaling the impact of SRL on school achievement at different levels of education (e.g., Duckworth et al., 2010; Galla & Duckworth, 2015; Wolfe & Johnson, 1995). Research also shows that possessing SRL skills enables learners to complete their tasks on time, create a balance between academic life and other responsibilities in their lives, and inhibit the negative feelings which negatively influence the learning process (Cleary & Zimmerman, 2004; Duckworth et al., 2012; Tangney, Baumeister, & Boone, 2004). Besides, as Boekaerts (1999) indicated, SRL carries importance even for life after academic studies. For this reason, helping learners to acquire SRL skills has the utmost importance for both educational and social life. Peeters et al. (2014) also underline this importance and state the notion that such skills are teachable. In line with their statement, many other researchers signaled that teaching practices, as well as educational contexts, can be shaped to promote SRL (e.g., Dembo & Eaton, 2000; Paris & Paris, 2001; Perry et al., 2004; Perry & Vandekamp, 2000; Zimmerman, 2002; Zimmerman & Schunk, 2001). At this point, the beliefs of teachers gain importance as they are the actors of this process, and their beliefs can be named as the major construct shaping their thinking (Richardson, 1996). Considering the "practice what you preach" principle (Ashton, 1990), it is essential to reveal the beliefs of teachers on SRL. The present study acted on this necessity and revealed that the teachers working at the top ranking science high schools of Türkiye have extensive knowledge of SRL, and they use various methods to promote SRL among their learners. To elaborate, all the teachers successfully presented a definition of SRL in the interviews conducted with the teacher providing clear examples from their context of teaching. Besides, they successfully compared students with good SRL skills and students who lack SRL skills. As stated by Paris and Winograd (2003), the more insights teachers that pertinent to SRL, the better they can facilitate the SRL process of their students. Moreover, the SRLTB (Self-Regulated Learning Teacher Belief Scale) showed that a great majority of teachers believe that SRL is applicable to their teaching context and it is beneficial for their students to do

so. This study, in a way, showed that these beliefs of teachers are the "terminus a quo" of the practices that lead to more self-regulated learners. To elaborate, the teachers strongly believe that SRL is the key that opens many doors to learning. Thus, they provide opportunities for their students to regulate their learning process, and if they feel that their students fail to do so, they promote certain SRL strategies to help their students to regulate again. This can be named as one of the fundamental reasons why science high school students have an established practice of self-regulation. As underscored by Perry and VandeKamp (2000), when teachers adjust the learning context and teaching practices in a way to facilitate the SRL process, students make progress in becoming more self-regulated learners such as having better skills of self-evaluation, attention focusing as well as higher motivation (Boekaerts, 1997; Cleary & Zimmerman, 2002; Perry & Vandekamp, 2000; Schunk, 1996; Zimmerman, 2002; Zimmerman & Schunk, 2001). This takes us to the professional development activities training teachers on the nature of SRL and SRL practices to promote among students, as also indicated by Peeters et al. (2014). These beliefs and knowledge of SRL can be a predictor of SRL promotion among students, as also revealed in the present study. The present study revealed that the teachers firmly believe in the importance of SRL, and they have a great deal of practice to promote it among their students. Thus, we can increase SRL-related knowledge of teachers to evoke positive beliefs about SRL so as to empower teachers to equip their students with SRL skills which is a finding stated by Dignath-van Ewijk and Van der Werf (2012). This is an essential step to have more self-regulated learners, as also confirmed in the present study.

5.4. The Instruction Related Factors Promoting the SRL Strategies of Students

In their article exploring how far we have come to combine theory and practice in self-regulation, Boekaerts and Cascallar (2006) ask some important questions related to the development of SRL strategies: "Why do some students self-regulate the learning process and others do not? What cues in the learning environment trigger self-regulation strategies? What can teachers do to help students self-regulate their learning, motivation, and effort in the classroom?" (p.200). The present study attempted to answer these questions by collecting data from both teachers and students. The analysis of the data collected from the students and teachers showed that teachers

of different layers of K12 education made different contributions to the SRL process. Although teachers of all layers played roles, the students particularly emphasized the role of the primary school teacher in the process. Though the contribution of the teachers to the SRL process has been emphasized in research, there are not many studies highlighting the crucial role of primary school teachers in the development of SRL in the later stages of education. For this reason, the present study made a unique contribution to the literature by underlining the vital role of primary school teachers and their methods in the development of SRL. By actively working on promoting SRL by *teaching SRL skills, building rapport with students, and generating academic interest in students*, primary school teachers made a unique contribution. While these methods are also employed by other teachers, too, primary school teachers were emphasized by the students. This takes us to the conclusion that such methods are much more effective when they are applied to students at a younger age. Thus, students internalize SRL, and it leads to permanent practices of SRL in the following years.

Additionally, as stated by Boekaerts et al. (2006), the devotion of teachers and their expectations from the students are two essential factors that can trigger SRL. The results of the present study are in line with what Boekaerts et al. (2006) stated, as the analysis of the data showed that particularly primary school teachers of the self-regulated students are devoted. They take their job seriously, and they have high expectations from their students. However, the teachers of science high schools and middle schools can also be portrayed as devoted because they were also reported to employ various methods to enhance the SRL process. Thus, it can be concluded here that self-regulated students are the shared product of teachers of all layers of education since they all have a role to play.

Apart from this finding, the present study uncovered that teachers can promote the SRL process directly and indirectly. To elaborate, the teachers can directly enhance the SRL process by teaching SRL strategies to the students. There are several empirical studies in the literature indicating the positive impact of SRL training on SRL strategy development (e.g., Azevedo and Cromley, 2004; Bautista, 2012; Becker, 2013; Fuchs et al., 2003; Perels et al., 2009; Jivet et al. 2020; Rozendaal et al., 2003). This study also reveals that teachers directly impact the SRL development of students by coaching

their SRL process. They teach *time management skills, keep track of their students' learning process, introduce them to task strategies,* and motivate them to do SRL. In addition, they help their students to do self-regulation and praise the progress they have made. The results of the present study showed that these are acts of teachers that enrich the SRL process. Particularly, *keeping a record of* students' learning has been stressed by the students. It has been noted that when teachers *keep a record of students'* learning at an early age, the students gradually develop this habit. Besides, they feel more motivated to regulate their acts as they are being observed and supervised by their teacher and their progress is being checked. The students might even need this as high school. As stated earlier, SRL is not a talent that stays with the student at all costs. It is a skill that the students need to work on on a regular basis. At some point, they might be less regulated. As these points, *keeping a record of students'* learning by the teachers can be instrumental in helping the students to be regulated again. This finding was emphasized by the students as they expressed that they need to be supervised to stay regulated. This is also true for *time management*. Teaching time management has been noted as an act that teachers do to facilitate SRL. Although science high school students are known to have good time management skills, they might need some support to manage time, especially when there are changes in their lives, such as starting to study at a boarding school. At this point, teachers take the stage and help them manage time effectively by teaching them more SRL strategies. This finding of the study supported the notion that SRL should be worked on regularly to be maintained and teachers can greatly help by applying these strategies.

Besides, teachers *integrate IT* into the teaching and learning process so as to promote the SRL process, which was also stated by Lewis and Mendelsohn (1993). In line with the results of the present study, there is evidence in the literature that *IT integration* can predict SRL development as with the help of the technology, teachers can generate interest among their students related to the class content by using a variety of visual, audial and textual sources and motivate them to keep learning after school by arousing curiosity. Besides, they are able to use multiple sources of information thanks to *IT integration*. This is a finding that is also supported by Yen et al. (2005).

In addition to the direct impact of teachers, there are acts of them that promote SRL process indirectly. Boekaerts et al. (2006) provides a summary of the teacher behavior that promotes SRL. Making the class content as clear as possible for students, being enthusiastic about teaching, use of humor, activating prior content, arranging the pace of instruction and structuring the lesson so as to make it less intimidating for the learners are some indirect methods to enhance the SRL process. The findings of the present study offer some examples of such behavior. It has been revealed in the present study that teachers *link the class content with daily life* examples which makes the content of the course more interesting for the students and help them carry on learning even after the school bell rings. The findings also suggested that the teachers are willing to teach and they are motivated by the success of their students. This creates a *positive learning environment* in which students can ask questions without hesitation. Besides, teachers stated that they *activate prior content* before they move onto the new content which provides a clear lesson structure for the students and they are likely to be able to link the new information with the already existing one thanks to that. Besides, *use of questioning method* has been found to be effective as a method to trigger SRL in line with what Boekaerts et al. (2006) mentioned. Furthermore, there is evidence in research that the interaction between teachers and students, as well as between students, has a tremendous impact on the development of SRL (e.g., Boekaerts & Cascallar, 2006) though it affects the process indirectly. In this study, *building rapport with students* has been highlighted. That is, the role of positive interaction between teachers and students has been underlined. In line with what Zimmerman (2005) stated, the present study revealed that teachers can facilitate the SRL process by building a positive link with their students. This eases the help-seeking process and coaching of SRL strategies. Trust and positive interaction between students and teachers lead to the arousal of motivational feelings on both sides, triggering the SRL process. Besides, as emphasized by Boekaerts (2006) and Perry (2002), collaboration among students is a key point in SRL. In line with the results of the present study, research states that students who cooperate with their peers find it easier to self-regulate. This study elaborates on these results and indicates that collaboration among students is a cornerstone in the SRL process as students seek help from each other and they provide models to one another. Thus, teacher behaviors to

encourage *collaborative learning* can kill more than one bird with one stone leading to the promotion of SRL, among other benefits.

5.5. Student Related Factors Promoting the SRL Strategies of Students

The underlying reasons why some learners successfully regulate their learning process as well as their life while others fail to do so have been a popular one in research. The research on this issue focused on certain characteristics, such as setting effective goals, making decisions, or prioritizing their goals (Sheldon & Elliot, 1998). There are other factors mentioned, like knowledge of metacognition (Winne, 1996), information literacy (Jukes et al., 2000), emotional regulation (Malmivuori, 2006). Also, Winne and Hadwin (1998) define self-regulation as an aptitude in their model. Besides, there is research indicating that self-regulation is a reflection of personality traits (e.g., Wolfe & Johnson, 1995). However, there are not many studies in the literature exploring student related factors which promote the development of such SRL strategies like social background, parental support or individual factors like traits. The present study makes a distinctive contribution to the research revealing that *parents* and *siblings* play key roles in the development of SRL strategies. The results of this study showed that a devoted mother or father who is closely interested in developing self-regulation skills in the child can be very effective in this process. They can coach the process and enhance self-efficacy beliefs by giving autonomy to the child. The results of the present study also showed that parents could promote the process effectively if they start to coach the SRL process in the early years of education, that is, primary school. This tells us that instruction is not the only factor in the promotion of SRL. There are also important *student related factors* like *parents.* In line with the results of this study, Grolnick and Ryan (1989) and Grolnick (2009) report that parental autonomy support was positively correlated with children's self-evaluation process as a component of self-regulation. They underlined that the styles of parents to support the learning process of their kids and the way that they motivate their children impact the self-regulation process. They also state that while the kids of authoritarian parents develop a kind of regulation depending on the authority figure, the kids of authoritative figures develop an inner discipline to be self-regulated. Besides, parents' involvement and positive attention of parents can result in higher

levels of concentration (Gordon et al., 1981; Patterson, 1976), the acts of regulation (Hatfield, Ferguson, & Alpert, 1967; Patterson, 1976), and regulation of emotions (Baldwin et al., 1945; Loeb et al. 1980) as well as predictors of self-regulation. Recent studies justify these results and also add that children and parents co-regulate first which leads to the development of self-regulation (e.g., Perry, 2019). This is also in line with the findings of the present study, as the participants stated that their parents accompanied that in their early years of education, and then they started to self-regulate. Also, this shows us that the more parents have an awareness of SRL, the better they help their kids to develop such skills. The findings of the present study denoted that parents have different styles of coaching the process, but they all have an awareness of the issue. Besides, they had their children practice these skills at an early age. The students underlined the impacts of both teachers and parents which takes us to the importance of parent-school cooperation and the importance of raising awareness of SRL via this cooperation.

In addition, a sibling as a good role model of self-regulation can be very effective in motivating children to self-regulate (Schunk & Zimmerman, 2007). In addition, siblings can *coach the process* or *provide companionship* in the self-regulating process, which all eases the process. This finding again contributes to the notion that self-regulation can be socially facilitated. Students can develop SRL skills in a smoother way when they have company. This finding is parallel with the finding of the importance of *peer collaboration* which also denotes that students can regulate their behaviors much more effectively when they have self-regulated peers around them. Their peers *provide inspiration to them* by providing good role models. They can even *teach SRL strategies* to each other. Besides, they can facilitate *help-seeking* process by being available to be consulted. These findings all reinforce the social side of SRL and tell us that teaching SRL strategies and leaving the rest to the learner is not enough to promote SRL. What really makes the difference is accompanying the learner in the SRL process, which can be done by a parent, sibling, or peer.

In the same way, *social background of the students* can have an impact on the SRL development of the learner too. This can occur in two ways. The social background of the students can form good role models and provide an ambitious studying

environment in which the learner has to regulate their behavior to fit in. It can also be just the opposite, and the learner may have to self-regulate so as to be different. Because the impact of the social environment is unpredictable, it can only be assessed with the effects of the other variables such as parents, siblings or instruction.

Last but not least, *self-efficacy beliefs* and *critical thinking skills* were indicated as key individual variables in the development of self-regulation. As Bandura (1997) stated, perceived self-efficacy is directly related to people's beliefs in their capabilities to achieve fulfillment of the given tasks. With the help of the four branches feeding self-efficacy, namely mastery experiences, vicarious experiences, verbal persuasion, and physiological and affective states, the way how a learner approaches the given challenges change. In line with the findings of the present study, Duckworth and Carlson (2013) also state that self-efficacy is a key determinant of SRL as it impacts many other cognitive, metacognitive, and behavioral processes. Similarly, Schunk and Zimmerman (2007) put forward that self-efficacy determines the choice of actions and it has a great impact on how the learners perceive and arrange their environment. *Having higher self-efficacy* beliefs as a triggering factor of SRL was a striking result of this study. When the participants of this study were asked what they would do if they had a difficult exam, lots of things to study, and limited time, none of them said they would get panicked, and this would make studying difficult for them. The sample of the present study included academically successful skills who obviously have high self-efficacy beliefs, too, because students felt confident that they would succeed and they could easily regulate their emotions. The students mentioned the strategies they would use under such circumstances, but they never touched upon the exam fear they would have. In addition, several students emphasized that they excel at certain courses, such as Math. This shows us that one of the most important characteristics of self-regulated learners is that they *have high self-efficacy beliefs,* which keeps them self-regulated. To elaborate, considering the results of the present study and the present literature, it is possible to conclude that self-efficacy and self-regulation have a reciprocal relationship in which they can positively or negatively affect one another. That is, a learner with high self-efficacy beliefs is more likely to regulate their acts to learn more and more as they believe that they have the required capability to succeed.

In turn, a person with lower self-efficacy beliefs is less likely to organize their life to learn further as s/he believes that s/he stands a lower chance of achieving (Çapa Aydın et al., 2011; Schnoll & Zimmerman, 2001; Sungur, 2007). Finally, it is noteworthy to discuss the finding of the present study related to the critical thinking skills and self-regulation. *Critical thinking* includes a range of skills like checking the source of information, and its consistency, comparing it with prior knowledge and evaluation the information at hand critically (Lewis & Smith, 1993; Linn, 2000). Kuhn (1999) underscores that critical thinking is a metacognitive process in which individuals go through perception, comprehension, and evaluation stages of thinking. Therefore, there are studies in the literature (e.g., Uzuntiryaki-Kondakçı & Capa-Aydın, 2013) that associate metacognitive self-regulation with critical thinking. Thus, the research indicates the positive effect of self-regulation on critical thinking. The findings of the present study add to the research by providing the insight that critical thinking skill is also a contributor to the self-regulation process as the learners who possess better *critical thinking skills* better regulate themselves by carrying out effective *self-evaluation* processes. The findings of this study showed that because they are able to think critically by judging their sources, capabilities, and feasibilities or tasks, they can set effective goals and make strategic plans to attain them. Then they are able to critically evaluate each and every stage they go through and take precautions or make changes in their plans or acts to boost their performance. All of these require a great deal of *critical thinking*, and this facilitates the self-regulation process as it enables learners to surmount obstacles and carry on the regulation process. On a final note, it is important to state that one of the most prominent results of this study was teachers' emphasis on how they use questioning techniques, and they also underlined that they do this to improve the critical thinking skills of their students. They also mentioned how the critical thinking skills of their students impact their self-regulation process. For this reason, it is appropriate to infer that the fact that the critical thinking skills of these students are frequently enriched by their teachers can be an important contributing factor to their SRL process.

5.6. Implications for Practice

This study has several implications for practice. These implications can be particularly beneficial so as to promote SRL skills among students at primary, middle, and high school levels, and task strategies can be benefited at higher education levels as well.

To start with, this research has revealed several SRL strategies employed by students who have achieved academic success. Some of these strategies are considering the method of studying and the content prior to the time when they start studying and creating study programs, use of different sources, highlighting key information often with a colorful pen, taking notes of crucial information, creating a summary of the topic with their own sentences, getting online help or asking their peers or teachers for help. All these strategies can be made a part of the curriculum in primary, middle, and high schools, and they can be taught to the students. Some students may not know SRL strategies and might be struggling because of that. Getting information on SRL skills can help them start to develop an awareness of this issue, and they might start to blossom too. Both domain-specific task strategies and general SRL processes can be taught to the students so as to encourage them to develop such skills. The results of the present research showed that self-regulated students developed these skills at an early age. The participants of the study underlined that primary school was a crucial period in their lives to develop such skills. For this reason, based on the results of this study, it can be suggested that SRL strategies should be a part of the primary school curriculum, and the awareness of this issue can be started at even preschool age. Step by step, students can learn about SRL, and they can receive feedback from their teachers on their performance. Thus, they can gradually become more and more self-regulated learners. The results of this study also showed that the students needed the guidance of a teacher at the beginning of their journey of becoming self-regulated learners. For this reason, training teachers on this subject is also crucial. Teachers can guide the process at the early stages and help students to regulate their behavior when they have difficulty in doing so. Students who are exposed to SRL strategies as a part of their school curricula and practice the process with their teachers stand a better chance of being self-regulated learners. To illustrate, when SRL strategies become a part of the curriculum in primary school, teachers can start by helping their students to

set academic goals. Then they can guide their students to form multiple motivational beliefs attached to these goals. Thus, students can find reasons to self-regulate. In the next step, teachers can teach their pupils to manage their time and organize their studies by making study schedules. Students can make these schedules with the guidance of their teachers first, and then they can gradually start to do these on their own. Teachers can also provide information on task strategies and encourage their students to seek for help when they need it. Teachers can also use the questioning technique to help their students develop critical thinking skills and do self-evaluation.

Additionally, there are many instructional factors that were stated to be useful for developing SRL skills. There are several practices done by primary, middle, and high school teachers which positively influenced SRL development. Leading students to use various SRL strategies both general and domain-specific ones and encouraging them to plan their days around their studies, appreciating the progress they make and building communication channels to reach them to provide mentoring can be counted as the most effective ways to encourage students to self-regulate as stated in the present study. For this reason, prospective teachers, particularly primary school teachers, can be trained on this topic considering the results of the study so that they can start promoting SRL among their students during their teaching careers. Self-regulation and the factors affecting this process can have a bigger part of the curriculum of the faculties of education. Besides, in-service training can be provided to teachers so as to increase their knowledge of self-regulation and methods to facilitate this process. This could help us to have many more self-regulated students. IT integration should be a part of this training as well as it was stated as an important factor in facilitating SRL.

Similar training can be provided to the parents by schools so that the learning of SRL can be carried out at home as well. Awareness can be raised by the school so as to enable parents to support the SRL process of their children. Additionally, the results of the study showed that it is much easier to self-regulate in high school if learners practice doing it at a young age. As the self-regulation process is mostly about what happens after school, parents can play a crucial role in the process. For this reason, cooperation between schools and parents can play a crucial role in the development of the SRL process. Additionally, the findings of the present research showed that taking

responsibility of one's own life and learning greatly helps in the self-regulation process. For this reason, training families as well as teachers to give the responsibilities to the learners at a young age and have them take their own responsibility gradually can lead to the development of SRL skills.

Last but not least, one of the most significant results of the study is that cooperation among students facilitates the SRL process. When students cooperate with each other, they are less likely to be carried away with feelings of helplessness. They keep regulating their behaviour thanks to this collaboration. For this reason, considering the results of this study, it can be suggested that schools and teachers should find more ways to have students study together and create more opportunities for them to cooperate. Once the students feel safe getting help from another student, they are more likely to become a self-regulated learner. Creating group study hours at schools, implementing group projects based on problem-based learning, and encouraging peer learning can be some ways to enhance collaboration among students.

All in all, this study presented several factors affecting the development of SRL, which implies several methods to develop SRL, particularly at different ages. Utilizing these suggestions can help practitioners to raise more self-regulated learners.

5.7. Suggestions for Future Research

This study focuses on Turkish students studying at the top ranking high schools of Turkiye. However, so as to generalize the results of the study universally, it would be appropriate to include students from different nations and different regions of the world by applying the same research design. Thus, seeing particularly the impacts of the student related factors such as parental support, siblings or peers across cultures could be possible. Also, in this study, data were collected from students and teachers. However, in order to provide a more comprehensive report of the self-regulation construct, collecting data via direct observations of classrooms as well as by observing students in their natural settings can be useful. Also, this study focuses on the students studying at science high schools. A future study dealing with different types of high schools revealing their own self-regulation strategies and factors influential in developing them could be enlightening to see self-regulated learning in a range of

contexts. For this reason, comparative studies comparing the self-regulation skills of students from different countries as well as the ones comparing SRL strategies of students studying at different high schools, are recommended for future studies. In addition, longitudinal studies investigating how the SRL strategies of students emerge, develop, and change over time can be enlightening so as to understand the concept of self-regulation and how it has evolved over time in depth. Such longitudinal studies can contribute to the research as they are likely to enlighten the process of developing SRL strategies gradually, and they might offer a more comprehensive report of the factors promoting SRL strategy development and use. For this reason, such studies are highly recommended.

The results of this study showed that primary school teachers have a huge impact on the development of SRL strategies. For this reason, it can be a good idea to conduct research with primary school teachers so as to obtain a comprehensive report on the practices promoting SRL skills of the students. Primary school teachers can be observed and interviewed in order to see their SRL related beliefs and practices. Also, intervention studies offering training to primary school teachers on how to promote SRL among their students and follow-up studies to see the effect of this training are suggested.

Additionally, as parents have been reported to play a crucial role in the SRL process, research collecting data from the parents of students who are highly self-regulated could be enlightening.

Moreover, correlation studies investigating the relationship between the SRL related beliefs of teachers and the SRL skills of students can be investigated. This could contribute to the research by enlightening the relationship between these two variables.

Last but not least, this study focuses on the students of the top ranking science high schools of Türkiye who are academically successful and possess a range of SRL strategies. Furthermore, for the student interviews, the students who scored the highest in the SSRS were chosen and interviewed. For this reason, the students provided data on how what kinds of strategies they developed and the factors that facilitated this process. However, in order to obtain the full picture of this concept, students who have

not developed SRL strategies could have been included as well. The instruction they were exposed to could be investigated. The attitudes of their parents towards self-regulation could be researched. For this reason, as a future study, the researcher suggests conducting research on the students who are not really self-regulated. This may contribute to the research by shedding light on the factors which hindered the development of SRL strategies.

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APPENDICES

A. APPROVAL OF THE METU HUMAN SUBJECTS ETHICS COMMITTEE

UYGULAMALI ETİK ARAŞTIRMA MERKEZİ
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MIDDLE EAST TECHNICAL UNIVERSITY

Sayı: 28620816 /

14 NİSAN 2022

Konu : Değerlendirme Sonucu

Gönderen: ODTÜ İnsan Araştırmaları Etik Kurulu (İAEK)

İlgi : İnsan Araştırmaları Etik Kurulu Başvurusu

Sayın Yeşim ÇAPA AYDIN

Danışmanlığını yürüttüğünüz Lütfiye Seda Aydan'ın "Türkiye'nin En Yüksek Puanla Öğrenci Alan Fen Liselerinde Okuyan Öğrencilerin Öz Düzenleme Becerileri ve Bu Becerileri Geliştirmelerini Sağlayan Faktörler." başlıklı araştırmanız İnsan Araştırmaları Etik Kurulu tarafından uygun görülmüş ve **232-ODTUİAEK-2022** protokol numarası ile onaylanmıştır.

Saygılarımızla bilgilerinize sunarız.

Prof.Dr. Mine MISIRLISOY
İAEK Başkanı

B. PERMISSION FROM THE MINISTRY OF NATIONAL EDUCATION

T.C.
MİLLÎ EĞİTİM BAKANLIĞI
Ortaöğretim Genel Müdürlüğü

Sayı : E-84037561-605.01-50448661 26.05.2022
Konu : Araştırma Uygulama İzin Talebi
(Lütfiye Seda AYDAN)

DAĞITIM YERLERİNE

İlgi : a) Genel Müdürlüğümüz evrak sisteminde kayıtlı 13.05.2022 tarihli ve 49559113 sayılı yazı.
b) Millî Eğitim Bakanlığının 21.01.2020 tarihli ve 1563890 sayılı Araştırma Uygulama İzinleri 2020/2 Nolu Genelgesi.

Orta Doğu Teknik Üniversitesi Sosyal Bilimler Enstitüsü Eğitim Bilimleri Anabilim Dalı Eğitim Programları ve Öğretimi Doktora Programı öğrencisi Lütfiye Seda AYDAN'ın, ***"Türkiye'nin En Yüksek Puanla Öğrenci Alan Fen Liselerinde Okuyan Öğrencilerin Öz Düzenleme Becerileri ve Bu Becerileri Geliştirmelerini Sağlayan Faktörler"*** konulu çalışmasına veri sağlamak amacıyla anket ve görüşme çalışması yapma izin talebine ilişkin ilgi (a) yazı ve ekleri, ilgi (b) Genelge doğrultusunda incelenmiştir.

Bu kapsamda veri toplama aracının Adana, Ankara, İstanbul ve İzmir illerinde Genel Müdürlüğümüze bağlı Fen Liselerinde öğrenim gören öğrencilere ve eğitim veren öğretmenlere yönelik olarak, Türkiye Cumhuriyeti Anayasası, taraf olunan uluslararası anlaşmalar ve sözleşmeler başta olmak üzere, 6698 sayılı Kişisel Verilerin Korunması Hakkındaki Kanun ile yürürlükte olan tüm yasal düzenlemeler ve Türk Millî Eğitiminin genel ve özel amaçlarına uygun olacak şekilde, ilgi (b) Genelge doğrultusunda, eğitim ve öğretim aksatılmadan ve gönüllülük esas olmak üzere uygulanması, gerekli duyurunun yapılması ve araştırma sonucuna dair raporun bir örneğinin Ortaöğretim Genel Müdürlüğü İzleme ve Değerlendirme Daire Başkanlığı'na iletilmesi hususunda;

Bilgilerinizi ve gereğini rica ederim.

Halil İbrahim TOPÇU
Bakan a.
Genel Müdür

Ek: İlgi (a) yazı ve ekleri

Dağıtım:
Gereği:
4 İl Valiliğine
(İl Millî Eğitim Müdürlüğü)

Bilgi:
Orta Doğu Teknik Üniversitesi Rektörlüğüne
(Sosyal Bilimleri Enstitüsü Müdürlüğü)

Bu belge güvenli elektronik imza ile imzalanmıştır.
Adres : Atatürk Bulvarı 06648
Kızılay/ANKARA
Telefon No : 0 (312) 413 57 02
E-Posta: sinem.coskun@meb.gov.tr
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Bilgi için: Sinem COŞKUN - Öğretmen
Unvan : Öğretmen
İnternet Adresi: http://ogm.meb.gov.tr/ Faks:3124180739
Bu evrak güvenli elektronik imza ile imzalanmıştır. https://evraksorgu.meb.gov.tr adresinden 0188b-3ffa-3f4d-ad8f-37da kodu ile teyit edilebilir.

C. CONSENT FORM FOR THE SURVEY FOR STUDENTS

Değerli Katılımcı,

Bu çalışma Türkiye'nin en yüksek puanla öğrenci kabul eden fen liselerinde okuyan öğrencilerin özdüzenleme becerilerini ve bu becerileri etkileyen faktörleri araştırmaktadır. Bu kapsamda bu okullarda görev yapan öğretmenlerin de özdüzenleme becerisine dair inanışlarını ve bu beceriyi öğrencilere kazandırmak için öğretim sürecinde yaptıklarını da incelemektedir. Bu hedeflere ulaşmak için, araştırmacılar iki bölümden oluşan ekteki ölçek kullanılmaktadır.

Birinci bölümde kişisel bilgileri kapsayan ifadeler vardır. İkinci bölümde ise özdüzenleme alışkanlıklarınız üzerine sorular sorulmaktadır.

Kişisel bilgileriniz ve verdiğiniz **cevaplar hiç kimse ile paylaşılmayacak ve sadece bu çalışma için kullanılacaktır.** Ölçekte yer alan sorulara verdiğiniz yanıtlar, **kesinlikle size not vermek ya da sizi eleştirmek amacıyla kullanılmayacaktır.** Bu soruların herkes için geçerli doğru yanıtları bulunmamaktadır. Bu nedenle lütfen aşağıda verilen tüm soruları dikkatle okuyarak cevabınızı, ifadenin karşısındaki seçeneklerden sizin için en uygun olanı işaretleyerek belirtiniz. Sizden ricamız, ankette bulunan ifadeleri dikkatlice okuyup, görüş ve düşüncelerinizi ilgili dereceyi seçerek işaretlemeniz ve **boş madde bırakmamanızdır.** Tüm sorulara yanıt vermeniz çalışmanın tamamlanabilmesi için çok önemlidir. Bu anket yaklaşık 15 dakika almaktadır.

Çalışma ve sonuçları hakkında daha fazla bilgiye ulaşmak isterseniz, araştırmacı L. Seda Aydan (seda.aydan@tedu.edu.tr) ya da tez danışmanı Doç.Dr. Yeşim Çapa Aydın ile (capa@metu.edu.tr) iletişime geçebilirsiniz.

Katılımınız ve değerli vaktiniz için çok teşekkür ederiz.

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Yukarıdaki bilgileri okudum ve bu çalışmaya tamamen gönüllü olarak katılıyorum.

(Formu doldurup imzaladıktan sonra uygulayıcıya geri veriniz).

İsim Soyad Tarih İmza

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D. CONSENT FORM FOR THE SURVEY FOR TEACHERS

Değerli Katılımcı,

Bu çalışma Türkiye'nin en yüksek puanla öğrenci kabul eden fen liselerinde okuyan öğrencilerin özdüzenleme becerilerini ve bu becerileri etkileyen faktörleri araştırmaktadır. Bu kapsamda bu okullarda görev yapan öğretmenlerin de özdüzenleme becerisine dair inanışlarını ve bu beceriyi öğrencilere kazandırmak için öğretim sürecinde yaptıklarını da incelemektedir. Bu hedeflere ulaşmak için, araştırmacılar iki bölümden oluşan ekteki kısa anket kullanılmaktadır. Birinci bölümde kişisel bilgileri kapsayan ifadeler vardır. İkinci ise özdüzenleme becerisine dair algılarınız ve düşünceleriniz sorulmaktadır.

Kişisel bilgileriniz ve verdiğiniz cevaplar hiç kimse ile paylaşılmayacak ve sadece bu çalışma için kullanılacaktır. Sizden isteğimiz, ankette bulunan ifadeleri dikkatlice okuyup, görüş ve düşüncelerinizi ilgili dereceyi seçerek işaretlemeniz ve boş madde bırakmamanızdır. Tüm sorulara yanıt vermeniz çalışmanın tamamlanabilmesi için çok önemlidir. Bu anket yaklaşık 5 dakika almaktadır.

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İsim Soyad Tarih İmza

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E. INTERVIEW WITH STUDENTS

Değerli Katılımcı,

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Kişisel bilgileriniz ve verdiğiniz cevaplar hiç kimse ile paylaşılmayacak ve sadece bu çalışma için kullanılacaktır. Bu görüşme yaklaşık 30 dakika almaktadır. İstediğiniz soruya cevap vermeme ve görüşmeyi isteğiniz zaman bırakma hakkınız bulunmaktadır.

Çalışma ve sonuçları hakkında daha fazla bilgiye ulaşmak isterseniz, araştırmacı L. Seda Aydan (seda.aydan@tedu.edu.tr) ya da tez danışmanı Doç.Dr. Yeşim Çapa Aydın ile (capa@metu.edu.tr) iletişime geçebilirsiniz.

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İsim Soyad Tarih İmza

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Öğrenciler için Hazırlanan Görüşme Soruları	
1	Gelecekte ulaşmak istediğin mesleki hedefler nelerdir? Neden bu hedefi koydun? Bu hedefe nasıl ulaşmayı planlıyorsun?
2	Nasıl ders çalışırsın? Ders çalışmaya başlamadan önce neler yaparsın?
3	Ne zamandan beri bu şekilde çalışıyorsun? Neden bu şekilde çalışmaya başladın? (-Sence ailenin senin ders çalışma alışkanlıkların üzerinde etkisi var mıdır? Varsa nasıl? - Sence büyüdüğün çevrenin senin ders çalışma alışkanlıkları kazanmanda etkisi olmuş mudur? Olmuşsa nasıl? -Sence bundan önce okuduğun okulun veya öğretmenlerinin bu alışkanlığı kazanmana bir katkısı olmuş mudur?) -Sence bu alışkanlığı kazanmanda etkili olan başka faktörler nelerdir?)
4	Senin için en verimli ders çalışma yöntemi nedir? Neden? Bunu nereden öğrendin? (-Ders çalışırken çalışacağın ortamı da belirli bir şekilde düzenler misin? Nasıl? Neden? Ne zamandan beri?)
5	Ders çalışma alışkanlıkların Fen lisesinde okumaya başladıktan sonra değişti mi? Fen lisesindeki dersler veya öğretmenlerin uyguladığı herhangi bir yöntem senin öğrenme alışkanlıklarını değiştirdi mi?
6	Yakın bir tarihte çok önemli bir sınavın var ve çalışman gereken birçok konu var. Bu sınava nasıl çalışırsın? (Bu yöntemi ne zamandan beri kullanıyorsun? Bu yöntemi nasıl geliştirdin veya nereden öğrendin?)
7	Derslerde öğrenmeni kolaylaştırmak için uyguladığın bir yöntem var mı? Bu yöntemi nasıl öğrendin? (Aile, okul, dershane vb.) (-Konuları kendi kendine anlatır mısın? -Ek kaynaklara başvurur musun? -Birilerinden yardım ister misin?)
8	Diyelim ki yakında bir dersten sınavın var ve önemli bir konuyu anlamadın, bu durumda ne yaparsın? (- Neden bu yöntemi seçersin? –Ne zamandan beri bu yöntemi kullanıyorsun?)
9	Kendi öğrenme sürecini değerlendirir misin? (Eğer değerlendiriyorsan bunu nasıl yaparsın? Eğer değerlendirmiyorsan öğrenme sürecindeki ilerlemenin değerlendirmesini kim yapar? İlerleme kaydedip etmediğin nasıl anlarsın?)
10	Sence arkadaşlarının senin çalışma stratejilerinin senin üzerinde bir etkisi var mı? Onlardan yardım alıyor musun? Nasıl?
11	Ders çalışırken uyguladığın stratejiler dersten derse farklılık gösteriyor mu?
12	Çalışırken en zevk aldığın ders hangisi? Sence neden bu dersi diğerlerinden daha çok seviyorsun?
13	En çok korktuğun ders hangisi? (Neden bu dersten korkuyorsun? Bu dersi senin için zor yapan şeyler nelerdir?)

F. INTERVIEW WITH TEACHERS

Değerli Katılımcı,

Bu çalışma Türkiye'nin en yüksek puanla öğrenci kabul eden fen liselerinde okuyan öğrencilerin özdüzenleme becerilerini ve bu becerileri etkileyen faktörleri araştırmaktadır. Bu kapsamda bu okullarda görev yapan öğretmenlerin de özdüzenleme becerisine dair inanışlarını ve bu beceriyi öğrencilere kazandırmak için öğretim sürecinde yaptıklarını da incelemektedir. Bu hedeflere ulaşmak için görüşmeler yapılmaktadır.

Kişisel bilgileriniz ve verdiğiniz cevaplar hiç kimse ile paylaşılmayacak ve sadece bu çalışma için kullanılacaktır. Bu görüşme yaklaşık 30 dakika almaktadır. İstediğiniz soruya cevap vermeme ve görüşmeyi isteğiniz zaman bırakma hakkınız bulunmaktadır.

Çalışma ve sonuçları hakkında daha fazla bilgiye ulaşmak isterseniz, araştırmacı L. Seda Aydan (seda.aydan@tedu.edu.tr) ya da tez danışmanı Doç.Dr. Yeşim Çapa Aydın ile (capa@metu.edu.tr) iletişime geçebilirsiniz.

Katılımınız ve değerli vaktiniz için çok teşekkür ederiz.

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Yukarıdaki bilgileri okudum ve bu çalışmaya tamamen gönüllü olarak katılıyorum.

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İsim Soyad Tarih İmza

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Öğretmenler için Hazırlanan Görüşme Soruları	
1	Sizce özdüzenleme becerisi nedir? Özdüzenleme becerisi yüksek olan bir öğrenciyi nasıl tanımlarsınız?
2	Şu anki öğrencilerinizin özdüzenleme becerileri sizce ne düzeydedir? Neden bu şekilde olduğunu düşünüyorsunuz? Başka bir okulda tecrübeniz var mı? Sizce şimdiki öğrencileriniz özdüzenleme açısından önceki öğrencilerinizden farklı mı? Nasıl?
3	Genel olarak ders işleme sürecinizi anlatır mısınız? Derslerde neler yaparsınız? Konuları nasıl öğretirsiniz?
4	Siz derslerinizde öğrencilerin özdüzenleme becerilerini geliştirmek için her hangi bir faaliyet yapıyor musunuz? Yapıyorsanız neler? Neden bunları yapıyorsunuz? (Çalışma tabloları hazırlatmak, konuyu onlara anlattırmak, grup çalışmaları yaptırmak vb.)
5	Öğrencilerinize öğrenme hedefleri koymaları konusunda yardımcı olur musunuz? Nasıl?
6	Öğrencilerinizi dersinize karşı nasıl motive edersiniz?
7	Öğrencilerinizin öğrenmekte zorlandıkları konularda nasıl yardımcı olursunuz? Örnek verebilir misiniz? Neden bu metodu kullanıyorsunuz?
8	Öğrencilerinizi ders dışında kalan zamanlarını etkili kullanmaları konusunda yönlendirir misiniz? Nasıl?
9	Öğrencilerinizin sizin dersinizi nasıl çalışmalarını önerirsiniz? Neden?
10	Öğrencilerinize öğrenme süreçleri ile ilgili geri dönüt sağlar mısınız? Bunu nasıl yaparsınız?
11	Yüz yüze olan derslerinizde teknolojiyi kullanır mısınız? Nasıl?
12	Ders sırasında öğrencilerin bir birlerinden yardım alarak öğrenmesini içeren faaliyetler yaptırır mısınız? Cevabınız evet ise bunlar nelerdir?
13	Öğrencilerinizi ders dışında da öğrenme süreçlerinin devam edebilmesi için farklı kaynaklara yönlendirir misiniz? Nasıl?
14	Öğrencilerin bireysel olarak kendilerini değerlendirmeleri için faaliyetler yaptırır mısınız? Nasıl?

G. PARENT CONSENT FORM

Veli Onay Formu

Sevgili Anne/Baba/Yasal Veli/Sorumlu Kişi,

Bu çalışma Orta Doğu Teknik Üniversitesi doktora öğrencisi Lütfiye Seda Aydan tarafından Doç. Dr. Yeşim Çapa Aydın danışmanlığında yürütülmektedir.

Bu çalışmanın amacı nedir? Bu çalışma Türkiye'nin en yüksek puanla öğrenci kabul eden fen liselerinde okuyan öğrencilerin özdüzenleme becerilerini ve bu becerileri etkileyen faktörleri araştırmaktadır. Bu kapsamda bu okullarda görev yapan öğretmenlerin de özdüzenleme becerisine dair inanışlarını ve bu beceriyi öğrencilere kazandırmak için öğretim sürecinde yaptıklarını da incelemektedir.

Çocuğunuzun katılımcı olarak ne yapmasını istiyoruz?: Bu amaç doğrultusunda öğrenciden iki bölümden oluşan bir ölçek cevaplamasını isteyeceğiz ve cevaplarını yazılı biçiminde toplayacağız. Bunun yanı sıra seçilen öğrencilerle görüşmeler yapacağız ve bu görüşmelerde ses kaydı alacağız. Sizden ilgili kişinin katılımcı olmasıyla ilgili izin istediğimiz gibi, çalışmaya başlamadan öğrenciden de sözlü olarak katılımıyla ilgili rızası mutlaka alınacak.

Çocuğunuzdan alınan bilgiler ne amaçla ve nasıl kullanılacak?: Öğrencilerden alacağımız cevaplar tamamen gizli tutulacak ve sadece araştırmacılar tarafından değerlendirilecektir. Elde edilecek bilgiler sadece bilimsel amaçla (yayın, konferans sunumu, vb.) kullanılacak, çocuğunuzun ya da sizin ismi ve kimlik bilgileriniz, hiçbir şekilde kimseyle paylaşılmayacaktır.

Çocuğunuz ya da siz çalışmayı yarıda kesmek isterseniz ne yapmalısınız?: Katılım sırasında sorulan sorulardan ya da herhangi bir uygulama ile ilgili başka bir nedenden ötürü öğrenci kendisini rahatsız hissettiğini belirtirse, ya da kendi belirtmese de araştırmacı öğrencinin rahatsız olduğunu öngörürse, çalışmaya sorular tamamlanmadan ve derhal son verilecektir.

Bu çalışmayla ilgili daha fazla bilgi almak isterseniz: Çalışmaya katılımınızın sonrasında, bu çalışmayla ilgili sorularınız yazılı biçimde cevaplandırılacaktır. Çalışma hakkında daha fazla bilgi almak için ODTÜ Eğitim Programları ve Öğretim doktora öğrencisi L.Seda Aydan ile (e162071@tmetu.edu.tr) ile iletişim kurabilirsiniz. Bu çalışmaya katılımınız için şimdiden teşekkür ederiz.

Yukarıdaki bilgileri okudum ve çocuğumun bu çalışmada yer almasını onaylıyorum (Lütfen alttaki iki seçenekten birini işaretleyiniz.

Evet onaylıyorum___ ***Hayır, onaylamıyorum___***

Velinin/Sorumlu Kişinin adı-soyadı: _____ Bugünün Tarihi:_____

Çocuğun adı soyadı ve doğum tarihi:_____

(Formu doldurup imzaladıktan sonra araştırmacıya ulaştırınız).

H. DATA COLLECTION ANNOUNCEMENT FOR SCHOOLS

Değerli ……. Fen Lisesi öğrencileri ve Öğretmenleri,

Orta Doğu Teknik Üniversitesi doktora öğrencisi Lütfiye Seda Aydan tarafından Doç. Dr. Yeşim Çapa Aydın danışmanlığında Türkiye'nin en başarılı Fen liselerinde okuyan öğrencilerin özdüzenleme becerileri ve bu becerilerin gelişmesine katkıda bulunan faktörler üzerine bir çalışma yürütülmektedir.

Bu çalışma Türkiye'nin en yüksek puanla öğrenci kabul eden fen liselerinde okuyan öğrencilerin özdüzenleme becerilerini ve bu becerileri etkileyen faktörleri araştırmaktadır. Bu kapsamda bu okullarda görev yapan öğretmenlerin de özdüzenleme becerisine dair inanışlarını ve bu beceriyi öğrencilere kazandırmak için öğretim sürecinde yaptıklarını da incelemektedir.

Bu araştırmaya veri toplamak amacıyla öğrencilerden ve öğretmenlerden veri toplanması hedeflenmektedir. Öğrencilere 29 maddelik öğretmenlere ise 10 maddelik bir ölçek uygulanması ve hem öğretmenlerle hem öğrencilerle görüşmelerin yapılması amaçlanmaktadır.

Öğretmenlerin ve öğrencilerin kişisel bilgileri ve verdiği cevaplar hiç kimse ile paylaşılmayacak ve sadece bu çalışma için kullanılacaktır.

Bu araştırmanın yürütülebilmesi için desteğinizi rica eder, şimdiden çok teşekkür ederiz.

Çalışma ve sonuçları hakkında daha fazla bilgiye ulaşmak isterseniz, araştırmacı L. Seda Aydan (seda.aydan@tedu.edu.tr) ya da tez danışmanı Doç.Dr. Yeşim Çapa Aydın ile (capa@metu.edu.tr) iletişime geçebilirsiniz.

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I. INTERVIEW QUESTIONS FOR STUDENTS AND THEIR THEORETICAL FRAMEWORK

	Interview Questions	The strategy or the factor it investigates
1.	What is your future academic goal? How are you planning to reach this goal?	goal-setting and planning
2.	How do you study? What do you do before you start studying?	strategic planning, goal orientation, environmental structuring
3.	Since when have you been studying in this way? Why did you start studying like that (-Do you think your family have an effect on your study habits? If so, how? In your opinion, does the environment you grew up has an impact on your study habits? If so, how? In your opinion, what are the other factors affecting your study habits?	individual or instruction related factors affecting self-regulation
4.	How do your start studying? What is the most effective way of studying for you? (Do you organize the environment before your start studying?)	self-control, self-instruction, imagery, attention focusing, task strategies, environmental structuring, factors affecting the use of SRL strategies
5.	Have your study habits changed since you started to study in a science high school? Have your teachers or a particular method that they apply been influential on your learning habits?	instruction related factors affecting the use of SRL strategies
6.	You have a very important exam in the coming days and you have a lot to cover, but limited time to study. How would you study for this exam? (Since when have you been using this method? How have you learned or developed this method?)	SRL strategies used by the students and the factors affecting their promotion
7.	Is there a method you apply to facilitate your learning during lessons? How did you learn this method? (-Do you instruct yourself? –Do you look for extra sources? –Do you get from other people?)	task strategies and the factors affecting the development of these strategies, self-instruction, seeking peer, teachers or adults assistance
8.	If you have an upcoming exam and if you do not really understand an exam the topic, what do you do? How do you solve this problem? (-Since when do you do this?)	seeking peer, teachers or adults assistance and reviewing text, notes and textbooks and factors affecting these SRL processes
9.	Do you ever evaluate your learning process? (If so, how do you do this? If not, how do you understand if you make progress or not?)	self-evaluation, self-judgment,
10	Do your friends have an impact on your learning strategies? Do you ever learn new strategies from them?	peer assistance
11	Do the learning strategies you apply differ from one course to another?	SRL strategies as a general concept or domain specific strategy
12	For which course do you enjoy studying the most? Why do you think you like this course better than the others	causal attribution as self-reaction as SRL processes & self-efficacy as an indicator of SRL

	Interview Questions	The strategy or the factor it investigates
13	About which course do you feel insecure about the most? (Why do you think you feel insecure about this course? What makes this course difficult for you?)	causal attribution and self-reaction as SRL processes & self-efficacy as an indicator of SRL

J. INTERVIEW QUESTIONS FOR TEACHERS AND THE PURPOSE THEY SERVED

	Interview Questions for Teachers	The purpose of the question
1.	In your opinion, what is self-regulation? How would you describe a highly self-regulated student?	Investigating the beliefs of teachers on self-regulation
2.	Are the students that you are teaching now self-regulated? If so, in your opinion what factors have made them self-regulated? Have you ever worked in another school? If so, were your students different from the ones that you are teaching now in terms of self-regulation? If so, How?	Searching for the instruction related or student related factors affecting self-regulation
3.	Could you please describe your teaching process in general? How do you teach the subjects? What activities do you usually benefit from in classroom?	Searching for the instruction related factors such as group assignments activating relevant prior knowledge, Preparing the students for group assignments by providing prior knowledge, inviting students to work in interactive learning groups and coach student behavior during collaborative learning
4.	Do you employ some methods to improve SRL self-regulation strategies of your students? If yes, what methods do you employ and why? (creating weekly programs, having them give presentations, doing collaborative work and so on)	Investigating instruction related factors affecting self-regulation (in class activities fostering SRL)
5.	Do you help your students to set academic goas? How?	Investigating instruction related factors affecting self-regulation (goal setting)
6.	How do you motivate your students to learn better?	Investigating instruction related factors affecting self-regulation (motivation)
7.	How do you help your students with the subject that they have difficulty in learning? Why do you use that methods?	Investigating instruction related factors affecting self-regulation (clarification)
8.	Do you guide your students to manage their time efficiently How?	Investigating instruction related factors affecting self-regulation (teaching SRL strategies)
9.	How should your students study for your course? Why?	Investigating instruction related factors affecting self-regulation (teaching SRL strategies)

	Interview Questions for Teachers	The purpose of the question
10.	Do you provide feedback to your students related to their learning process? How?	Investigating instruction related factors affecting self-regulation (providing feedback)
11.	Do you use technology in your face to face classes? How?	Investigating instruction related factors affecting self-regulation (IT integration)

K. TURKISH SUMMARY / TÜRKÇE ÖZET

TOHUMDAN AĞACA: TÜRKİYE'NİN EN YÜKSEK PUANLA ÖĞRENCİ ALAN FEN LİSELERİNDE OKUYAN ÖĞRENCİLERİN ÖZDÜZENLEME BECERİLERİ VE BU BECERİLERİ GELİŞTİRMELERİNDE ETKİLİ OLAN FAKTÖRLER

1. Giriş

Özdüzenleme becerisi, kim olmayı ya da olmamayı seçtiğimiz ile ilgili önemli bir süreçtir ve günlük hayattaki seçimlerimizle ilgili birçok süreci kapsar (Vohs & Baumeister, 2016). Zimmerman (2011) Özdüzenlemenin zihinsel ya da akademik bir performans becerisi olmadığını daha ziyade, öğrencilerin zihinsel becerilerini akademik becerilere dönüştürebilecekleri, kendi kendilerini yönlendirdikleri bir süreç olduğunu belirtir. Özdüzenleme becerileri geliştirmiş öğrenciler öğrenme süreçlerini planlamakta, bu planları hayata geçirmekte ve daha sonra da bu süreci değerlendirmektedir. Bu basit gibi görünen süreç aslında her öğrenci için farklıdır ve aslında iç içe geçmiş birçok karmaşık süreç içermektedir.

Özdüzenleme ve öz kontrol çoğu zaman bir birlerinin yerine kullanılan terimlerdir fakat araştırmalar göstermiştir ki aslında özdüzenleme, öz kontrolü kapsayan bir süreçtir. Öz kontrol dürtüleri ve istekleri kontrol etmeyi amaçlarken, özdüzenleme ise bir hedefe yönelik olarak hareketleri düzenlemeyi ifade eder. Rodolfo (2000)'nun da belirttiği gibi özdüzenleme ilk önce hayatta kalma için gereklidir çünkü vücut hayatta kalmak için çeşitli biyolojik düzenlemeler yapar. Buradan da anlaşılacaktır ki özdüzenleme bilinçli bir şekilde yapılabildiği gibi vücudun bir tepkisi olarak da meydana gelebilir. Bunun yanında özkontrol bilinçli olarak hareketleri kontrol etmeyi ve amaca ya da kurallara uygun hareket etmeyi amaçlar.

Özdüzenleme ile ilgili araştırmalar hem teori hem de pratik üzerinde yoğunlaşmıştır. Özdüzenlemeyi teorik olarak araştıran çalışmalar özdüzenleme süreciyle ilgili bilişsel süreçleri incelerken, pratiğe yönelik çalışmalar ise özdüzenlemenin günlük hayattaki hareketlerimize nasıl yansıdığını incelemektedir. Birçok özdüzenlemeli öğrenme çalışması ise iki süreci de kapsayacak şekilde yapılmıştır ve özdüzenlemenin öğrenme amacına hizmet eden yönünü ele almıştır. Pintrich (2005) özdüzenlemeli öğrenmeyi, öğrencinin hedefler koyduğu ve bu hedeflere ulaşabilmek için çeşitli stratejiler uyguladığı bu sırada da kendini gözlemlediği ve değerlendirdiği aktif ve yapılandırıcı bir süreç olarak tanımlar. Heikkala and Lonka (2006) ise özdüzenlemeli öğrenme becerilerine sahip bir öğrenciyi kendi öğrenmesinin sorumluluğunu alan öğrenme hedefleri koyan ve bu hedefleri gerçekleştirmek için motivasyonunu koruyan bir birey olarak tanımlar. Kadıoğlu, Uzuntiryaki and Capa-Aydın (2011) ise özdüzenlemeli öğrenmenin sadece dersin içeriğini iyi bir şekilde öğrenmeye yaramadığını aynı zamanda öğrenme yöntemleri geliştirmesine, öğrenmeye devam etmek için içsel motivasyon geliştirmesine ve hayat boyu öğrenme becerileri kazandırmasına yardımcı olduğunu belirtir. Flook, Goldberg, Pinger and Davidson (2015) ise özdüzenleme becerisinin öğrenme sürecinin en önemli parçalarından biri olduğu vurgular ve özdüzenlemeden yoksun olmanın öğrencilerde adapte olamama ve kendini çaresizlik duygularına kaptırma gibi öğrenme sürecini baltalayan sorunlara yol açtığını belirtir.

Belirtilen araştırmaların da gösterdiği gibi özdüzenleme öğrenme için kritik bir beceridir ve öğrencilerde bu beceriyi geliştirme akademik başarı için ve hatta sosyal hayat için de önem arz etmektedir (Zimmerman&Schunk, 2011). Öğrenme sürecinde bireylerin özdüzenleme becerileri önemli bir yer tutmaktadır. Özdüzenleme, bireyin kendi hedef ve stratejileri doğrultusunda bilişşel düzeyini yükseltmesi, çalışma koşullarını düzenlemesi, çevresel koşullara uyumlanması gibi pek çok bileşeni içerisinde barındırır. Başarının ve akademik performansın en önemli belirleyici olduğu düşünülen kavramlardan biri olan öz-düzenleme kavramı, pek çok kuramsal bakış açısıyla tanımlanmış ve modellendirilmiştir. Bu modellerin hepsinde öğrenci aktif olarak kendi öğrenme sürecini yönetmektedir. Fakat modeller özdüzenleme sürecini farklı açılardan ele almaktadırlar ve özdüzenlemenin farklı aşamalarını aydınlatmaktadırlar. Literatürde bahsedilen farklı öz-düzenleme modellerinden

bazıları, Zimmerman'ın öz-düzenlemeye dayalı öğrenme modeli, Pintrich'in öz-düzenlemeye dayalı öğrenme modeli, Winne'nin öz-düzenleme modeli, Borkowski'nin süreç odaklı bilişsel modeli, Boekearts'in uyarlanabilir öğrenme modelidir. Zimmerman, Pintrich ve Boekaerts modelleri öz-düzenlemeyi amaç odaklı döngüsel bir süreç olarak tanımlarken, Borkowski ve Winne'nin modellerinde ise öz-düzenleme, öğrenme için gerekli olan bilişsel taktikler ve stratejilerin seçimini ve kullanımını ifade eden üstbilişsel süreç olarak tanımlanmaktadır. Ayrıca modellerin, öz-düzenlemeli öğrenme aşamalarında farklılıkların olduğu, ancak bireyin aktif katılımı, kendi öğrenmelerini gözleme ve değerlendirme aşamalarının benzer olduğu görülmüştür

Kısacası öz düzenleme becerisi öğrenmeyi öğrenmenin en önemli ögelerinden biridir. Özdüzenleme becerileri akademik anlamda kullanabileceği gibi yaşamın her döneminde oldukça etkin olarak kullanılabilir. Bu nedenle özdüzenleme becerisini geliştirme yöntemleri üzerine olan çalışmalar hem teori hem de pratik için önemlidir. Bu çalışma özdüzenleme becerisini geliştiren faktörlerin araştırılması ihtiyacından yola çıkmıştır. Özdüzenleme kavramını çeşitli açılardan ele almaktadır ve özdüzenlemenin doğası, özdüzenleme becerileri ve bu becerilerin gelişmesine yardımcı olan faktörleri kapsamlı bir şekilde incelemektedir.

1.1. Amaç ve Araştırma Soruları

Bu araştırmanın iki temel amacı vardır. Birincisi özdüzenlemeli öğrenme sürecinin yapısını ve özelliklerini ortaya çıkarmaktır. Bu bağlamda, Türkiye'nin en yüksek puanla öğrenci alan fen liselerinde okuyan öğrencilerin özdüzenlemeli öğrenmede kullandıkları stratejiler araştırılmıştır. Ayrıca özdüzenlemeli öğrenmenin alana özgü bir becerimi yoksa genel bir süreç mi olduğu da araştırılmıştır. Araştırmanın ikinci odağı ise özdüzenlemeli öğrenmenin nasıl geliştiğini bulmaktır. Bu doğrultuda ise Türkiye'nin en başarılı fen liselerinde görev yapan öğretmenlerin özdüzenlemeli öğrenme sürecine dair görüşleri araştırılmıştır. Ayrıca özdüzenlemenin gelişmesini etkileyen öğretimle ilgili faktörler ve öğrenci ile ilgili faktörler de araştırılmıştır. Böylece özdüzenlemeli öğrenme süreci bir çok açıdan ayrıntılı şekilde ele alınmış ve rapor edilmiştir.

Bu çalışmanın araştırma soruları şöyledir:

1. Türkiye'nin en yüksek puanla öğrenci olan fen liselerinde okuyan öğrencilerin özdüzenlemeli öğrenme stratejileri nelerdir?
    - Türkiye'nin en yüksek puanla öğrenci olan fen liselerinde okuyan öğrencilerin özdüzenlemeli öğrenme stratejileri bir alandan diğerine farlılık gösterir mi?
2. Türkiye'nin en yüksek puanla öğrenci olan fen liselerinde çalışan öğretmenlerin özdüzenlemeli öğrenmeye dair görüşleri nelerdir?
3. Türkiye'nin en yüksek puanla öğrenci olan fen liselerinde okuyan öğrencilerin özdüzenlemeli öğrenme sürecini etkileyen öğretim ile ilgili faktörler nelerdir?
4. Türkiye'nin en yüksek puanla öğrenci olan fen liselerinde okuyan öğrencilerin özdüzenlemeli öğrenme sürecini etkileyen öğrenci ile ilgili faktörler nelerdir?

1.2. Araştırmanın Önemi

Şu ana kadar okul başarısı üzerinde yapılan çalışmalar daha çok zekâ üzerinde yoğunlaşırken son zamanlarda yapılan araştırmalar özdüzenlemeli öğrenmenin okul başarısı üzerindeki önemini vurgulamaktadır (Duckworth & Carlson, 2013). Zimmerman (1989) da öğrenme öğrencilere yapılan bir süreç değil öğrenciler tarafından yapılan bir süreçtir diyerek özdüzenlemenin öğrenme sürecindeki rolüne işaret etmektedir (s.22). Aynı şekilde, duyguları, dürtüleri, dikkati ve davranışları kontrol etmenin okul başarısına götürdüğünü gösteren birçok çalışma mevcuttur (örn. Denham, Bassett, Way, Mincic, Zinsser, & Graling, 2012; Duckworth & Carlson, 2013; Nota, Soresi & Zimmerman, 2004; Schunk, 2005; Schunk & Zimmerman, 2012). Fakat neden bazı öğrenciler başarılı bir şekilde hayatlarını ve öğrenme sürecini düzenlerken diğerleri yapamamaktadır ya da özdüzenlemenin gelişmesini etkileyen faktörler nelerdir gibi soruların cevaplanması için daha fazla araştırmaya ihtiyaç duyulmaktadır (Boekaerts & & Cascallar, 2006). Ayrıca Boekaerts and Corno (2005) özdüzenlemeli öğrenmeye dair teorilerin ancak pratikte özdüzenlemenin öğrenme amaçlarına nasıl hizmet ettiğini ortaya çıkarırsa faydalı olabileceğini ortaya

koymuştur. Bu nedenle bu çalışma Türkiye'nin en yüksek puanla öğrenci olan fen liselerinde okuyan öğrencilerin özdüzenlemeli öğrenme stratejilerini ele almakta ve bunları ortaya çıkarmaktadır. Böylece özdüzenlemeli öğrenme kavramı ve bu sürecin nasıl geliştiği aydınlatılmış öğretmenlere ve öğrencilere yol gösterici verilere ulaşılmıştır. Ayrıca özdüzenlemeli öğrenme sürecini ve bu süreci besleyen faktörleri sunarak bu alandaki literatüre de katkıda bulunmaktadır.

Bunun yanında Alexander et al. (2011) özdüzenleme sürecinin karmaşık bir süreç olduğunun ve bu sürecin alanlara özgü mü yoksa genel bir beceri mi olduğunu ortaya çıkarılması için daha fazla araştırma yapılması gerektiğini belirtmiştir. Bu çalışma literatürdeki bu boşluğu doldurmaya hizmet emekte ve özdüzenlemeli öğrenmenin karmaşık doğasını aydınlatmak için veriler sunmaktadır. Özdüzenlemeli öğrenmenin hem alan özgü hem de genel özelliklerini sunarak bu konuya ışık tutmaktadır.

Ayrıca özdüzenlemeli öğrenmenin laboratuvar ortamlarında nasıl geliştiğine dair birçok araştırma bulunurken (örn. Bandura & Schunk, 1981; Mischel & Mischel, 1983), doğal öğrenme ortamlarında yani okullarda nasıl geliştiğine dair görece az çalışma bulunmaktadır (Zimmerman & Pons, 1986 ve bu çalışmalar genellikle Avrupa ve Kuzey Amerika'da yapılmıştır (Schunk, 2005). Ayrıca fen alanında uzmanlaşan öğrencilere dair olan çalışmalar sayıca çok azdır. Bu nedenle bu çalışma Türkiye bağlamında olan ve fen liselerinde okuyan öğrencilerin özdüzenleme becerilerini doğal öğrenme ortamlarında incelemekte ve özdüzenlemenin daha iyi anlaşılıp uygulanmasına olanak sağlamaktadır. Hem özdüzenleme stratejilerini hem de bu stratejilerin geliştirilme sürecini ortaya çıkararak bu konuyu aydınlatmakta ve literatürdeki bilgileri ayrıntılandırmaktadır.

Ayrıca özdüzenlemeyi geliştiren öğretimle ilgili ve öğrenci ile ilgili faktörleri aydınlatarak bunların pratiğe geçirilmesine de olanak sağlamaktadır. Son olarak da bu çalışma öğretmenlerin özdüzenlemeye dair görüşlerini de içermektedir. Bu da eğitim fakültesi müfredatlarında yapılabilecek değişikliklere ya da meslek içi eğitimlerin içeriklerinin yapılandırılmasına yardımcı olacaktır.

2. Yöntem

2.1. Araştırma Deseni

Bu araştırma karma araştırma yönteminden faydalanmakta ve hem nicel hem de nitel veriler içermektedir. Nicel ve nitel yöntemlerin birleştirilmesi ve yorumlanması metodu olarak da karma araştırma yönteminin bir alt dalı olan açıklayıcı sıralı karma yöntemler araştırması metodunu kullanılmıştır. Bu yöntem doğrultusunda önce küme örneklemesi yöntemiyle nicel veriler Özdüzenlemeli Öğrenme Stratejileri Ölçeği (ÖÖSÖ) aracılığı ile öğrencilerden ve Öz-Düzenlemeli Öğrenme Öğretmen İnanç Ölçeği (ÖÖÖİÖ) aracılığı ile öğretmenlerden toplanmıştır. Küme örneklemesi yöntemi ile ilk önce Türkiye'nin en yüksek puanla öğrenci olan fen liseleri belirlenmiş daha sonra da bunlar arasından seçkisiz olarak 5 fen lisesi seçilmiştir. Bu fen liselerindeki 9. ve 10. Sınıf öğrencilerine önce Kadioğlu, Uzuntiryaki and Çapa (2011) tarafından geliştirilen Özdüzenlemeli Öğrenme Stratejileri Ölçeği (ÖÖSÖ) uygulanmıştır. Daha sonra her okuldan bu ölçekten en yüksek puanı alan 3 öğrenci belirlenmiş ve bu öğrencilerle mülakatlar yapılarak nitel veriler toplanmıştır. Öğretmenlere ise Lombaerts, De Backer, Engels, Van Braak and Athanasou (2009) tarafından geliştirilen Öz-Düzenlemeli Öğrenme Öğretmen İnanç Ölçeği (ÖÖÖİÖ) uygulanmış ve öğretmenlerin özdüzenlemeye dair inançları tespit edilmiştir. Daha sonra ise maksimum çeşitlilik örnekleme yöntemi ile öğrettikleri ders, tecrübe yılı ve cinsiyet bakımından maksimum çeşitliliği gösterecek şekilde öğretmenler seçilerek onlarla da mülakatlar yapılmış ve nitel veriler toplamıştır.

Araştırmanın birinci sorusu olan Türkiye'nin en yüksek puanla öğrenci olan fen liselerinde okuyan öğrencilerin özdüzenlemeli öğrenme stratejileri önce Özdüzenlemeli Öğrenme Stratejileri Ölçeği (ÖÖSÖ) aracılığı ile belirlenmiş daha sonra mülakatlar aracılığı ile öğrencilerin bu stratejileri açıklamaları, bu stratejilere eklemeler yapmaları istenmiştir. Aynı şekilde araştırmanın ikinci sorusu olan Türkiye'nin en yüksek puanla öğrenci olan fen liselerinde çalışan öğretmenlerin özdüzenlemeli öğrenmeye dair görüşleri Öz-Düzenlemeli Öğrenme Öğretmen İnanç Ölçeği (ÖÖÖİÖ) aracılığıyla belirlenmiştir. Ayrıca öğretmenler bu görüşlerini mülakatlar aracılığıyla detaylandırmış ve örneklendirmişlerdir. Böylece önce nicel veri toplanmış sonra da nitel veriler aracılığı ile bu veriler detaylandırılmış ve

genişletilmiştir. Bunun yanında yine öğrencilerle yapılan mülakatlar aracılığıyla Türkiye'nin en yüksek puanla öğrenci olan fen liselerinde okuyan öğrencilerin özdüzenlemeli öğrenme stratejilerinin bir alandan diğerine farklılık gösterip göstermediği saptanmıştır.

Bunun yanı sıra hem öğrenci hem de öğretmen mülakatları aracılığı ile özdüzenleme becerilerinin gelişmesine katkıda bulunan hem öğretim ile ilgili hem de öğrenci ile ilgili faktörler belirlenmiştir. Bu yüzden bu araştırma nitel veri ağırlıklı karma desene sahip bir araştırma olarak adlandırılabilir.

2.2. Veri Toplama Araçları

Bu araştırmanın nicel verilerinin toplanmasında Kadioğlu, Uzuntiryaki and Çapa (2011) tarafından geliştirilen Özdüzenlemeli Öğrenme Stratejileri Ölçeği (ÖÖSÖ) ve ise Lombaerts, De Backer, Engels, Van Braak and Athanasou (2009) tarafından geliştirilen Öz-Düzenlemeli Öğrenme Öğretmen İnanç Ölçeği (ÖÖÖİÖ) uygulanmıştır. Bunun yanında öğrenciler ve öğretmenler için mülakat soruları geliştirilmiştir. Mülakat sorularının hazırlanması için daha önce yapılmış çalışmalardan ve Zimmerman and Pons (1986)'un önerdiği yönergelerden faydalanılmıştır. Önce alan taraması yapılarak özdüzenlemeye dair anahtar kelimelere ve aşamalara ulaşılmıştır. Daha sonra bu aşamalar göz önünde bulundurularak özdüzenlemeli öğrenme sürecini araştırmaya yardımcı olacak sorular hazırlanmıştır. Bu sorular daha sonra alanda doktora sahibi üç uzman tarafından incelenmiş ve görüş alınmıştır. Daha sonra ise bu sorular iki öğrenci ve iki de öğretmen ile pilot çalışma yapılarak denenmiştir. Bu deneme görüşmeleri neticesinde sorular üzerinde değişiklikler yapılmış açık olmayan noktalat değiştirilmiş ve alt sorular eklenmiştir. Soruların son hali verilmeden önce tekrar uzman görüşü alınmış ve son haline getirilerek veri toplama sürecine başlanmıştır.

Mülakat soruları hem öğrencilere hem de öğretmenlere bir bağlam içinde sorulmuştur. Sorular hazırlandıktan sonra alanda uzman üç kişiden görüş alınması ve değişiklikler yapılması sürecin verimli bi şekilde ilerlemesini ve özdüzenlemeli öğrenmeye dair ayrıntılı veri toplanmasını sağlamıştır. Ayrıca mülakat sorularının pilot çalışma

aracılığıyla denenmesi olası problemlerin fark edilmesi ve çözülmesine olanak sağlamıştır. Araştırma soruları doğrultusunda bir akış içerisinde yarı yapılandırılmış olarak sorular sorulmuş ve bu mülakatların çözümlemesi yapılmıştır. Bu görüşmelerin çözümlemeleri incelenmiş ve mülakatların gidişatı göz önünde bulundurularak mülakat sorularının son hali verilmiştir.

2.3. Veri Toplama Süreci

Araştırmanın planlama süreci tamamlandıktan sonra 2021-2022 akademik yılının bahar döneminde, ODTÜ Uygulamalı Etik Araştırma Merkezinden araştırmanın ve veri toplama araçlarının uygunluğuna ilişkin onay alınmıştır. Araştırmanın etik onayı alındıktan sonra Milli Eğitim Bakanlığına (MEB) ve Orta Öğretim Genel Müdürlüğüne başvurularak, ilgili okullarda çalışmanın yürütülmesi için gerekli izinler alınmıştır. Daha sonra okul yönetimleri ve psikolojik danışman ve rehber öğretmenlerle iletişim kurularak araştırmanın verilerinin toplanması için uygun günler kararlaştırılmıştır. En çok öğrencinin okulda olacağı tarihler belirlenmiştir. Daha sonra araştırmacı çalışmaya katılan 5 fen lisesini de kendisi ziyaret ederek verileri toplamıştır. Araştırmacı her bir okulda en az bir gün geçirmiş verileri toplamış ve mülakat yapılacak öğretmenlerle ön görüşmeler yapmıştır. Mülakat yapılacak öğrencilerin belirlenmesi için Özdüzenlemeli Öğrenme Stratejileri Ölçeğinden elde edilen veriler aynı gün birer Microsoft Office Excel dosyasında toplanmış ve en yüksek puanı alan öğrenciler okul numaralarından belirlenerek okulların psikolojik danışmanları aracılığıyla iletişim kurularak görüşmeye davet edilmiştir. Öğretmenler için ise bu okullardan en yüksek çeşitliliği sağlayacak şekilde seçilmiştir. Sınavlar aracılığı ile değerlendirilen bütün ana derslerin öğretmenleri ile görüşülmüştür. Öğrencilerle ve öğretmenlerle görüşmeler çevrim içi olarak zoom uygulaması aracılığı ile yapılmıştır. Veri toplama süreci 16 Mayıs 2022'de başlamış ve 12 Haziran 2022'de tamamlanmıştır.

2.4. Verilerin Analizi

Bu çalışmada he nicel hem de nitel veri toplandığı için iki farklı analiz yöntemi de kullanılmıştır. Nicel verilerin analizi için IBM SPSS Statistics for Windows (Versiyon

27.0) kullanılmıştır ve bu verilerin istatistiksel analizi elde edilmiştir. Nitel analiz içinse içerik analizi yöntemi uygulanmıştır. Bu içeriği analiz edebilmek için çeşitli kodlar belirlenmiştir. Bu kodların büyük bir kısmı daha önceki yapılan çalışmalardan yararlanılmıştır bir kısmı ise veri analizi sırasında ortaya çıkmıştır. Bu kodları ve kategorileri analiz ederken MAXQDA 2022 (VERBI Software, 2021) bilgisayar programı kullanılmıştır. Verileri araştırmacı analiz etmiş fakat bu program sayesinde verilerin organize bir biçimde sunulması sağlanmıştır. Araştırmacı öncelikle bütün mülakatların çözümlemesini elde etmiş. Daha sonra bir öğrenci ve bir de öğretmen görüşmesinin analizini yapmıştır. Aynı öğrenci ve öğretmenin mülakatı eirim alanında başka bir doktora adayı tarafından da kodlanmış bu kodlar karşılaştırılarak değişiklikler yapılmıştır. Ayrıca araştırmacı bu kod analizini eğitim alanında doktora sahibi 3 uzmana sunmuş ve görüşlerini almıştır. Kodlar ve kategorileri uzmanlarla tartıştıktan ve son halini verdikten sonra veri analizine devam etmiştir. Veri analizi yaparken durumları ayrıntılı şekilde raporlamaya ve anlamlandırmaya dikkat etmiş, kayıtları tekrar tekrar dinleyerek doğru kodu doğru veri ile eşleştirdiğinden emin olmuştur (Marshall ve Rossman, 2011; Miles ve Huberman, 1994; Patton, 1990).

Ayrıca, bu araştırmanın geçerlik ve güvenirliğinin inandırıcılık, aktarıla bilirlik, tutarlık ve teyit edilebilirlik ilkelerini sağlayabilmesi için bir takım metotlardan yararlanılmıştır. İnandırıcılık prensibi için uzman incelemesi, pilot çalışmalar yapma, derinlik odaklı veri toplama, katılımcı ve veri toplama yöntemi çeşitlemesi, görüşmelere dair notlar alma, kodlayıcıların arasında tutarlılık sağlanması gibi metotlar kullanılmıştır. Bunun yanı sıra, araştırmanın aktarıla bilirliği için örnekleme yöntemleri, araştırmanın yapıldığı kurumlar, katılımcıların karakteristik özellikleri, veri toplama, veri analizi ve bulguların raporlanması gibi süreçler için ayrıntılı şekilde anlatılmıştır.

3. Bulgular

Bu araştırmanın soruları doğrultusunda şu konularda sonuçlar elde edilmiştir (1) Türkiye'nin en yüksek puanla öğrenci olan fen liselerinde okuyan öğrencilerin özdüzenlemeli öğrenme stratejileri, (1a) bu öğrenme stratejilerinin bir alandan diğerine farlılık gösterip göstermediği, (2) bu okullarda çalışan öğretmenlerin

özdüzenlemeli öğrenmeye dair görüşleri, (3) bu öğrencilerin özdüzenlemeli öğrenme sürecini etkileyen öğretim ile ilgili faktörler (4) bu öğrencilerin özdüzenlemeli öğrenme sürecini etkileyen öğrenci ile ilgili faktörler.

Araştırmanın sonuçları göstermiştir ki Türkiye'nin en yüksek puanla öğrenci olan fen liselerinde okuyan öğrenciler birçok özdüzenleme stratejisi kullanmaktadırlar. Bu öğrenciler kendilerine öğrenme hedefleri koymaktadırlar ve bu hedefleri başarmak ile ilgili farklı motivasyonlara sahiptirler. Hepsinin net hedefleri bulunmakta ve bu hedefler doğrultusunda öğrenciler kendi öğrenme süreçlerinin sorumluluğunu almakta ve öz kontrol sağlamaktadırlar. Hedef koyma ve bu hedefe yönelik birden fazla motivasyon kaynağına sahip olma öğrencilerin özdüzenlemeli öğrenme sürecine başlamalarının ilk adımlarıdır. Bu doğrultuda ise stratejik olarak öğrenme süreçlerini planlamakta ve çevrelerini düzenlemekte ve optimum öğrenmeyi gerçekleştirmek için şartları sağlamaktadırlar. Daha sonra kendilerini öğrenmeye yönlendirmekte ve dikkatini toplamak için sevdikleri konudan ya da kolay buldukları dersten başlama gibi stratejiler uygulamaktadır. Daha sonra ise geçmiş bilgilerini tazeleyerek çalışmaya başlamakta ve daha sonra çeşitli öğrenme stratejileri uygulamaktadır. Ayrıca öğrenme süreci içinde kendilerini değerlendirmekte ve buna göre kullandıkları stratejileri şekillendirmektedirler. Bunun yanı sıra anlamadıkları konularda çoğunlukla akranlarından bazen öğretmenlerinden sık sık da internetten yardım almaktadırlar. Bu araştırmanın en önemli bulgularından biri özdüzenlemenin yardımlaşma içeren sosyal bir süreç olduğudur. Öğrenciler bir birlerinde yardım alarak zorlandıkları konuları öğrenmekte ve özdüzenlemeye devam etmek için gerekli olan motivasyonu bulabilmektedirler. Bu nedenle çaresizlik duygusuna kapılmadan yardım alabilme özdüzenlemeli öğrenme sürecinin kritik bir parçasıdır. Ayrıca bu çalışma göstermiştir ki fen lisesindeki öğrencilerin özdüzenleme açısından farklı kılan şey özdüzenlemeleri öğrenme becerilerinde uzmanlaşmaları, bu becerileri etkili şekilde kullanmaları ve aynı anda birden fazla strateji kullanarak öğrenme süreçlerini etkili şekilde yönetmeleridir.

İkinci olarak araştırma sonuçları göstermiştir ki özdüzenlemeli öğrenme süreci genel bir süreçtir ama özdüzenleme sırasında kullanılan stratejiler bir akademik alandan diğerine farklılık göstermektedir. Öğrenciler her alan için hedefler koymakta ve

planlamalar yapmaktadır. Öz kontrol ya da öz değerlendirme gibi beceriler her alan için geçerlidir. Ama öğrenciler öğrenme sürecinde iken ya da ders çalışırken kullandıkları öğrenme yöntemleri dersten derse özellikle de sayısal derslerden sözel derslere farklılık göstermektedir. Öğrenciler başarılı olmaya dair hedeflerini her ders için koymakta özkontrol sağlamakta ve çalışmaya yönelmektedir. Ama çalışırken uyguladıkları stratejiler dersten derse farklılık göstermektedir. Örneğin, Matematik çalışırken arkadaşları ile çalışmaktadırlar ama sözel dersler için yalnız çalışmayı tercih etmektedirler.

Ayrıca bu araştırmanın sonuçları göstermiştir ki Türkiye'nin en yüksek puanla öğrenci olan fen liselerinde okuyan öğretmenler özdüzenlemeli öğrenme ile ilgili destekleyici görüşlere sahiptiler. Hem özdüzenlemeli öğrenme konusunda bilgi sahibi hem de bu öğrenme çeşidinin öğrencilere faydalı olacağına dair olumlu fikirlere sahiptirler. Buna paralel olarak bu araştırmanın sonuçları göstermiştir ki özdüzenlemeyi etkilen öğretimle ilgili birçok faktör bulunmaktadır. İlkokul öğretmenleri bu becerinin gelişmesinde en etkili olan öğretmenlerdir. Katılımcı öğrencilerin hepsi bu becerileri ilkokul düzeyinde geliştirdiklerini çünkü ilkokul öğretmenlerinin zaman yönetimi ve öğrenme yöntemleri konusunda kendilerine ışık tuttuklarını, onlarla iyi ilişkiler kurduklarını, onlarlarda akademik ilgi uyandırmaya çalıştıklarını belirtmişlerdir. Bu araştırmanın sonuçları göstermiştir ki özdüzenlemeli öğrenme becerilerinin geliştmesinde ilkokul dönemi en önemli dönemdir. Araştırmacının bütün katılımcıları bu becerilerinin başlangıcının ilkokul yıllarına dayandığını belirtmişlerdir. Bu da göstermektedir ki özdüzenleme becerileri erken yaşta kazanılmaktadır. Ayrıca ortaokul ve fen lisesi öğretmenlerinin de öğrenme yöntemlerini geliştirme ve var alan becerileri korumada ve geliştirmede etkili oldukları belirlenmiştir. Bunun yanında fen lisesi öğretmenlerinin de öğrencilerin özdüzenleme becerisini geliştirmek için birçok yöntem kullandıkları belirlenmiştir. Dersin içeriğini gerçek hayatla bağlama, öğrenme teknikleri konusunda bilgiler verme, öğrencilerin öğrenme sürecini takip etme, teknolojiyi kullanma öğrenciler ile pozitif ilişkiler kurma bunlardan bazılarıdır. Hem öğrenciler hem de öğretmenler bu yöntemlerin özdüzenlemeli öğrenme sürecine olumlu katkıda bulunduklarını belirtmişledir.

Son olarak Türkiye'nin en yüksek puanla öğrenci olan fen liselerinde okuyan öğrencilerin özdüzenleme becerileri geliştirmesinde etkili olan öğrenci ile ilgili olan faktörlerden bazıları ilgili ve öğrenme sürecini yönlendiren bir ebeveyne sahip olmak, bu konuda iyi bir rol model olan bir kardeşin varlığı, öz yeterliğe dair inançlar ve eleştirel düşünme yeteneğine sahip olmaktır. Ebeveynler veya kardeşler özdüzenleme konusunda iyi bir örnek oluşturablir ya da özdüzenleme becerilerini öğretebilirler. Birçok katılımcı annesinin, babasının veya abi ya da ablasının özdüzenleme sürecine olumlu katkılarının altını çizmiştir. Bunun yanında katılımcı öğrencilerinin özyeterlik inançlarının olumlu olduğu gözlenmiştir. Öğrenciler zor sınavların üstesinden gelebileceklerine ve başarılı olacaklarına inanmakta bu da özdüzenleme sürecini beslemektedir. Ayrıca eleştirel düşünme yeteneği özdüzenlemeye birçok açıdan katkıda bulunmaktadır. Eleştirel düşünme yeteneğine sahip öğrenciler özdeğerlendirme sürecini etkili bir şekilde yürütmekte ve kendi değerlendirmeleri neticesinde özdüzenleme süreçlerini düzenlemektedirler. Ayrıca, bu özelliklere sahip öğrenciler daha kolay özdüzenleme becerileri geliştirmekte ve bunları korumaktadırlar.

4. Tartışma ve Öneriler

Bu araştırma özdüzenleme sürecine ve özdüzenleme becerilerine Türkiye'nin en yüksek puanla öğrenci olan fen liselerinde okuyan öğrencilerden ve bu okullarda çalışan öğretmenlerden veri toplayarak bu alandaki çalışmalara katkıda bulunmuştur. Bu çalışmanın Türkiye'nin en yüksek puanla öğrenci olan fen liselerinde okuyan öğrencilerin kullandığı özdüzenleme becerilerini ortaya çıkarmayı hedefleyen ilk araştırma sorusu göstermiştir ki bu okullardan okuyan öğrencilerin hepsi net öğrenme hedeflerine, kariyer hedeflerine ve bu hedeflerine ulaşmaları için onları motive eden çeşitli inançlara sahiptirler. Zimmerman (2005)'in de belirttiği gibi özdüzenlemeli öğrenme için harekete geçmeden önce öğrenciler bir ön düşünme ve hazırlık sürecinden geçmektedirler. Bu süreç de Zimmerman (2005) öğrencilerin hedefler koyduğunu, öğrenme görevinin analizini yaptığını ve öğrenme sürecini stratejik olanlara planladıklarını belirtir. Aynı şekilde Pintrich (2005) de öğrencilerin bu ön hazırlık sürecinden geçtiğini hedef koyup planlamalar yaparken aynı zamanda da kendi öz yeterliklerine dair inançları ile hareket ederek hedeflerini şekillendirdiklerini

ya da bu doğrultu da zaman ve kaynak yönetimi yaptıklarını vurgular. Mevcut araştırmanın sonuçları da Zimmerman (2005) ve Pintrich (2005) modellerini doğrulamakta ayrıca da öğrencilerin bir sonraki adım olan harekete geçme aşamasına gelebilmek için öz kontrol mekanizmalarını aktive ettiklerini göstermektedir. Öğrenciler, her zaman öğrenmek ya da çalışmak istemeseler de bunu başarmanın yollarını bilinçli olarak aramakta ve öz kontrol sağlayarak kendilerini öğrenme görevine yönlendirmektedirler ve bu da özdüzenlemenin çok önemli bir aşamasını oluşturmaktadır (Hofmann, Baumeister, Förster, & Vohs, 2012; Letzring, Block, & Funder, 2005). Bunun yanında Jiusto and DiBiasio (2006) belirtmektedir ki öğrencilerin özdüzenlemeli öğrenme yoluna girebilmeleri için mutlaka kendi öğrenmelerinin sorumluluğunu üstlenmeleri gerekir. Bu araştırmanın sonuçları da bunu doğrulamakta ve kendi öğrenme sürecinin sorumluluğunu almanın ve başarılı veya başarısız olmanın sonuçlarını başkasına değil kendine yüklemenin özdüzenlemeli öğrenmenin kilit bir noktasını oluşturduğunu göstermektedir. Araştırmanın katılımcıları öğrenme süreçlerinden kendilerinin sorumlu olduğunu bu nedenle öğrenme süreçlerini kendilerinin yönettiğini belirtmişlerdir. Örneğin, çevreyi düzenleme, öz değerlendirme yapma ve bu değerlendirmenin sonucuna göre hareket etme öğrencilerin kendilerinin yönettiği süreçlerdir. Bunun yanı sıra öğrenciler hem başarıyı hem de başarısızlığı sahiplenmekte, ne başarıyı ne de başarısızlığı başkalarına atfetmemektedir.

Bunun yanında bu çalışma doğrulamıştır ki çevreyi de öğrenmeyi kolaylaştıracak şekilde organize etmenin (Zimmerman and Pons, 1986), dikkati toplamak için çeşitli stratejiler kullanmanın (Cleary, 2018), çalışmaya başlarken eski bilgileri tazelemenin (Mayer, 2003), zaman yönetiminin (Pintrich, 2004) ve ayrıca da çeşitli öğrenme stratejilerini aktif ve bilinçli olarak kullanmanın özdüzenlemeli öğrenmenin gerçekleştirilmesinde önemli katkıları vardır. Ayrıca bu çalışmanın en önemli sonuçlarından biri özdüzenlemeli öğrenme sürecinde yardım istemenin bu sürecin devamlılığını sağlayan en önemli noktalardan biri olduğudur. Zimmerman (2013) da yardım istemenin bu sürecin önemli bir parçası olduğunu belirtmektedir. Aynı şekilde bu çalışma göstermiştir ki özdüzenleme becerisi yüksek olan öğrenciler çoğunlukla bir birlerinden bazen öğretmenlerinden sık sık da internetten yardım almaktadırlar. Son

olarak da Schunk (1996) öz değerlendirmenin de özdüzenleme sürecini besleyen önemli bir beceri olduğunu belirtmiştir. Schunk (1996) ile paralel olarak bu çalışma da özdüzenlemeli öğrenme sürecini gerçekleştiren öğrencilerin sık sık öz değerlendirme yaptıklarını ve planlarını buna göre şekillendirdiklerini göstermiştir.

Ayrıca bu çalışmanın sonuçları göstermiştir ki özdüzenleme doğrusal ya da dairesel olamayacak kadar karmaşık bir süreçtir ve birçok özdüzenleme süreci aynı anda gerçekleşebilir ya da bir birini besleyebilir. Örneğin öğrenci hedeflerini koyarken özdeğerlendirme yapabilir ya da stratejik planlama yaparken çevreyi düzenleyebilir. Bu süreçlerin hepsi birbiri ile bağlantılı ve birbirini etkileyen süreçlerdir. Örneğin hedef koymayan bir öğrencinin çalışmaya yönelme becerisinin de zayıf olması beklenecektir.

Bu çalışma ayrıca özdüzenleme becerisinin alandan alana farklılık gösterip göstermediği sorusuna da cevap aramıştır. Araştırmanın sonuçları göstermiştir ki özdüzenlemenin birçok basamağı yani planlama, gerçekleştirme ya da değerlendirme aşamaları genel aşamalardır. Öğrenciler genel olarak bu aşamalardan geçerek özdüzenleme sürecini gerçekleştirmektedir. Bu araştırmanın sonuçlarına paralel olarak Winne ve Hadwin (1998) tarafından geliştirilen özdüzenleme modeli bu süreci genel olarak ele almaktadır. Aynı şekilde Zimmerman (2011) de özdüzenlemenin genel aşamalarından söz etmektedir. Bir diğer yandan bu araştırmanın sonuçları göstermiştir ki özdüzenleme süreci genel aşamalar içermektedir ama öğrenme sırasında kullanılan stratejiler bir alandan diğerine özellikle de sözel alanlar ve sayısal alanlar arasında da farklılık göstermektedir. Poitras and Lajoie (2013) bu kavramı tarih dersi açısından ele almakta ve bu araştırmanın sonuçlarını doğrulamaktadır. Aynı şekilde Boekaerts (1992, 1995, 1996a, 1996b) de kendi modelinde hem alandan alana değişen hem de genel olan özdüzenleme süreçlerine yer vermektedir.

Bu çalışmanın bir diğer odağı Türkiye'nin en yüksek puanla öğrenci olan fen liselerinde çalışan öğretmenlerin özdüzenlemeli öğrenmeye dair görüşleri idi. Ashton (1990)'ın da belirttiği gibi öğretmenlerin özdüzenlemeli öğrenme konusundaki görüşlerini ortaya çıkarmak özdüzenlemeli öğrenmenin gelişme sürecini anlamak için çok önemlidir. Araştırmanın sonuçları gösterdi ki bu okullardaki öğretmenler

özdüzenlemeli öğrenme konusunda geniş bilgiye sahipler ve bu öğrenmenin öğrencileri için çok faydalı olduğuna inanmaktadırlar. Bu nedenle öğretmenler öğrencilerinin özdüzenlemeli öğrenme süreçlerine katkıda bulunmak ve devamlılığını sağlamak adına çeşitli yöntemler uygulamaktadır. Perry ve VandeKamp (2000) tarafında da belirtildiği üzere özdüzenlemeli öğrenme için öğrenme ortamını şekillendirmekte onlara öz değerlendirme yapmaları için fırsatlar sunmakta ve motivasyon kaynakları yaratmaktadır. Bu bulgular da bizi bu araştırmanın özdüzenlemenin gelişmesini destekleyen öğretim ile ilgili faktörlere götürmektedirler. Araştırmanın sonuçları göstermiştir ki öğretmenler özdüzenlemeye dair inançları doğrultusunda hareket etmekte ve öğrencilerin bu sürecini aktif olarak desteklemektedir. Bunun için derste ve ders dışında faaliyetler yapmakta ve öğrencilerin özdüzenleme sürecine rehberlik etmektedirler. Boekaerts et al. (2006) öğretmenlerin kendisini öğretim sürecine adamasının ve öğrencilere dair yüksek beklentiler içinde olmasının özdüzenlemeyi etkilen iki önemli faktör olduğunu belirtmektedir. Bu araştırmanın sonuçları da bu bulguları desteklemektedir. Araştırmanın sonuçlarına göre idealist ve öğrencilerden yüksek beklentileri olan onlara öğrenme hedefleri koyan öğretmenler özdüzenleme becerisinin gelişmesine katkıda bulunmaktadır. Araştırmanın sonuçları ayrıca göstermiştir ki öğrencilerin özdüzenleme becerileri geliştirmesinde ilkokul öğretmenleri kritik bir öneme sahiptir. Bu da ilkokul öğretmenlerinin özdüzenleme becerisini geliştirme konusundaki farkındalığının arttırılmasının önemine işaret etmektedir. Ayrıca araştırma sonuçları ilkokul, ortaokul ve lise öğretmenlerinin öğrencilere özdüzenleme becerisi öğretme konusunda etkili olabileceklerini göstermiştir. Literatürdeki birçok çalışma da bu bulguyu desteklemektedir (örn. Azevedo and Cromley, 2004; Bautista, 2012; Becker, 2013; Fuchs et al.2003;Perels at al. 2009; Jivet, Scheffel et al. 2020; Rozendaal, Minnaert & Boekaerts, 2003). Aynı şekilde teknolojinin öğretim amaçlı kullanımı da özdüzenlemeyi geliştiren başka bir faktör olarak bu araştırmada yer almıştır ve bu bulguları Yen et al. (2005) da doğrulamaktadır.

Bunun yanında Boekaerts et al. (2006) özdüzenlemeyi geliştiren birçok öğretmen davranışı sıralamıştır. Bu davranışlar öğretmeye istekli olmak, dersi öğrencilere göre şekillendirmek ve ilginç hale getirmek, konuları sistematik bir şekilde öğretmek ve

öğrencilere özdüzenleme ve öğrenme stratejileri öğretmektir. Bu araştırma bu bulguları doğrulamış ayrıca da günlük hayat ve ders içeriği arasında bağlantı kurmanın özdüzenlemeyi geliştiren önemli bir faktör olduğunu ortaya çıkarmıştır.

Son olarak bu araştırma özdüzenleme becetlerinin gelişmesinde tol oynayan kişisel faktörleri de incelemiştir. Şu ana kadar özdüzenleme dair yapılmış çalışmalar bu konuya sıklıkla eğilmediği için bu araştırma özdüzenlemenin bu boyutuna önemli bir katkı sağlamaktadır. Araştırmanın sonuçları göstermiştir ki ilgili ve özdüzenlemeye eşlik eden bir ebeveyne sahip olmak özdüzenleme becerisini geliştiren çok önemli bir faktördür. Bunun yanında özdüzenleme becerileri geliştirmiş bir kardeşi gözlemlemek de bu sürece katkıda bulunmaktadır. Bu bulgular Schunk ve Zimmerman (2007) tarafından belirtilen model alma yöntemiyle gerçekleşen özdüzenlemeli öğrenme modeliyle uyuşmaktadır. Ayrıca özyeterliğe dair inanışların ve eleştirel düşünme becerisinin özdüzenleme sürecini etkileyen önemli bir faktör olduğu saptanmıştır. Carlson (2013)'ın da belirttiği gibi öz yeterliğe dair inanışlar bilişler ve üst bilişsel birçok süreci etkilediği için özdüzenleme sürecinde kritik bir öneme sahiptir. Bu araştırmanın sonuçları da bu bulguları doğrulamaktadır. Pozitif öz yeterlik duyguları özdüzenleme becerilerinin gelişmesine yol açarken öz yeterliğe dair negatif duygular süreci baltalamaktadır. Ayrıca eleştirel düşünme becerisinin özdüzenlemenin özellikle özdeğerlendirme aşamasını besleyerek süreci daha verimli hale getirdiği saptanmıştır.

Bu araştırma sonucunda uygulamaya dair birçok öneri elde edilebilir. Bu araştırma özdüzenleme stratejilerinin öğrencilere küçük yaştan itibaren öğretilmesinin olumlu sonuçlarının olduğunu ve öğretmenlerin bu konuda farkındalıkları olmasının önemli olduğunu göstermiştir. Bu sonuçlardan hareket ederek eğitim fakültelerinin müfredatlarında geleceğin öğretmenlerinin özdüzenleme konusundaki farkındalıklarının ve eğitimlerinin arttırılması için değişiklikler yapılabilir ya da mevcut öğretmenlere bu konuda meslek içi eğitim verilebilir. Bunun yanında özdüzenlemeli öğrenme ilköğretim ve lise seviyesinde müfredatın bir parçası yapılarak öğrencilere bu konuda eğitimler verilebilir ve stratejiler öğretilebilir. Eğitim programlarında yapılacak bu değişikliklerin daha fazla öğrencinin özdüzenleme becerileri geliştirmesini sağlaması muhtemeldir. Özdüzenlemenin öğrenmeye katkısı ise birçok çalışma tarafından da belirtilmiştir (örn. Duckworth, Tsukayama, & May,

2010; Galla & Duckworth, 2015; Wolfe & Johnson, 1995). Bu nedenle özdüzenleme kavramının hem öğretmen eğitiminde hem de ilköğretim ve lise öğretiminde müfredatın önemli bir parçası haline getirilmesi önerilmektedir.

Bunun yanı sıra özdüzenlemeli öğrenme ile ilgili bazı çalışmaların yapılması önerilmektedir. Bu araştırma göstermiştir ki ilkokul öğretmenleri özdüzenlemeli öğrenme becerilerinin gelişmesinde çok önemli bir rol oynamaktadır. Bu nedenle ilkokul öğretmenleri ile çalışmalar yürütülerek özdüzenlemeli öğrenme sürecine katkıda bulunan öğretmen davranışları ayrıntılı olarak ele alınabilir. Ayrıca bu öğretmenlere özdüzenlemeli öğrenmeye dair eğitimler verilerek bu eğitimlerin etkileri ölçülebilir. Bunun yanında boylamsal çalışmalar yapılarak özdüzenlemeli öğrenmenin başlama ve gelişme süreçleri ayrıntılı olarak inclenebilir. Bu tarz çalışmalar öğrenciden ilkokul ortaokul ve lise düzeyinde veri sağlayacağı için özdüzenlemeli öğrenme becerilerinin gelişme sürecinin aydınlatılmasında etkili olacaktır. Ayrıca öğretmenlerin özdüzenlemeye dair inançları ve öğrencilerin özdüzenleme becerileri arasındaki korelasyonu inceleyen çalışmalar bu iki değişken arasındaki ilişkinin aydınlatılmasına katkı sağlayacaktır.

L. THE CODES USED IN THE ANALYSIS OF THE QUALITATIVE DATA

SRL Strategies Employed by the Studentstable	This is a general category covering the first research question. Under this category fall the codes related to the strategies employed by the students to achieve self-regulated learning.
Goal setting	This is used when students mention how they set a particular aim to self-regulate their behavior.
Multiple motivational beliefs	This is used when students have more than one motivational belief to achieve a goal. *(e.g., " I want to excel in biology because I want to be a good doctor in the future.")*
Strategic Planning	This is used when students make a plan to achieve their goals in which they create detailed schedules, speculate on possible obstacles, and figure out certain solutions. Thus, they plan multiple stages.
Self-control	This is used when students mention how they apply strategies to take the control over their behaviors and start to self-regulate as a result of this controlling process.
Task Orientation	Task orientation refers to the student's acts to make a transition from other activities to start studying. This is an important part of SRL process as the student deliberately applies strategies to start regulating. It is considered a part of self-control process.
Taking the responsibility of one's own learning	This is also assessed as a part of the self-control process because students take over their responsibility of learning and act on this responsibility rather than putting the blame for learning or failure on others.
Environmental organization	This is used when students mention how they organize their physical learning environment to study better, such as cleaning the table or arranging sources.
Attention focusing	This is used when students mention how they find ways to focus their attention to start learning. This is considered an important step of SRL as the students regulate their acts to give their full attention to the learning task.
Prior content knowledge activation	This is used when students mention how they do a revision to recall the information they learned earlier to make a smooth transition to the new topics as a part of their SRL process.
Task strategies	This is used when students put forward particular learning strategies to handle the task at hand. This code was used when the students mentioned practical and efficient task strategies they used during the process.
Self-experimenting the task strategies	This is used when students mentioned how they developed the most practical and efficient strategy for themselves via trial and error. They experiment with the strategies and keep the most useful ones.

Deciding on what to learn before starting to study or making a to-do list	This is used when students mentioned how they make detailed plans about what they are going to study or how they are going to study including the content of their studies and their methods of study
Underlining the important parts	This is used when students mentioned how they underline the important parts to help them regulate their acts better. This is not about randomly underlining the content. It is about how students use this strategy to organize their learning.
Taking and revising notes	This is used when students mentioned how they take effective notes and how they make use of notes to regulate their learning later.
Self-teach	This is used when students mention how they apply self-teaching methods to continue their SRL process.
Use of multiple strategies at once	This is used when students mention how they use more than one task strategies to handle the task at hand.
Help seeking	This code is used when the students mention how they look for help when they cannot complete the learning task at hand. This was put forward as an important step to maintain SRL process. This help could be obtained from peers, online videos or teachers.
Self-evaluation	This is used when the student mentions how they make an evaluation of the efficiency of the task strategies they used and make changes if necessary.
SRL as a general or domain specific concept	This is a general category covering the sub-question of the first research question. It refers to answers that the students gave related to the domain-specific and general aspects of SRL.
General aspects of SRL	This is used when interviews with students reveal general stages of SRL such as forethought and evaluation.
Domain specific aspects of SRL	This is used when interviews with students indicate domain specific elements of SRL such as the use of task strategies during the performance phase.
SRL related beliefs of teachers	This is a general category used when teachers explained their beliefs related to SRL particularly positive impact of SRL strategies on academic achievement
Threats to SRL	This is used when teachers mentioned certain threats to the SRL process of their students such as the impact of COVID19 pandemic and technology.
Instruction related factors affecting the development of SRL	This is a general category covering the methods of instruction used by the teacher of different levels so as to encourage SRL learning.
The Role of Primary School Teachers	This is used when students mentioned how their primary school teachers promoted their SRL development.
The Role of Middle School Teachers	This is used when students mentioned how their primary school teachers impacted their SRL process.
The Role of Science High School Teachers	This is used when students mentioned how their science high school teachers facilitated their SRL process.
Teaching SRL skills	This is used when teachers or students mention how teachers teach students SRL skills to enhance their SRL process.

Teaching Time Management Skills	This is a subcategory of teaching SRL skills and refers to the activities helping students to gain time management skills via certain methods like creating study schedules.
Keeping a Record of Student Learning	This is a subcategory of teaching SRL skills and refers to the acts of teachers to keep the record of the learning process of their students to help them gain SRL skills.
Teaching Task Strategies	This is a subcategory of teaching SRL skills and refers to the acts of teachers to teach task strategies to the students so that they can handle the learning tasks. This includes strategies like effective note taking, benefiting from different sources or reaching correct information.
Building Rapport with Students	This is used when teachers or students mention how teachers make efforts to build a good relationship with their student. Thus, teachers make efforts to enhance the self-efficacy beliefs of their students, guide them to set goals and study in an organized way.
Generating academic interest in students	This is used when teachers or students mention how teachers use certain methods to arouse academic interest among students so that they keep learning after school.
IT integration	This is used when the teacher mentioned the use of IT to facilitate the SRL process of their students.
Collaborative Activities	This code refers to the pair and group work activities that the teachers assign to their students to encourage them to regulate their acts cooperatively.
Activating Prior Knowledge	This code is used when the teachers mention how they activate the prior content knowledge of their students in order to improve their instruction and provide a model to their students so that they would do the same thing in their SRL process.
Linking class content with daily life	This is used when teachers mention how they give examples from daily life to create a connection between academic content and daily life which is aimed to encourage students to keep learning after school.
Student Related Factors Affecting the development of SRL	This is a general category covering student related factors that facilitated the SRL strategy development of the learner.
Parental Support	This is used when students mention how their parents coach their SRL process
Modelling of Siblings	This is used when students mention how their siblings provide a good role model for them to be self-regulated, provide company during SRL process or coach SRL process.
Social background	This is used when students mention the effect of their social background on their SRL skills by creating a competitive environment that the student has to regulate their behavior to blend in or by providing an example of an adverse environment that the student wants to differ from.

Peer Collaboration	This is used when students mention how their friends coregulate with him/her and supply help if need be or provide good role models.
Individual factors	This is used to describe individual factors promoting SRL strategy development. These factors are related to the individual himself/herself such as the impact of self-efficacy beliefs and critical thinking skills.
Beliefs of Self Efficacy	This is used to describe how the beliefs of capabilities feed SRL process.
Critical thinking skills	This is used when the impact of critical thinking skills on various processes of SRL is mentioned.
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Self-control	This is used when students mention how they apply strategies to take the control over their behaviors and start to self-regulate as a result of this controlling process.
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M. CURRICULUM VITAE

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1. Degrees Obtained

Bachelor of Art: Foreign Language Education (2007 – 2011) /Middle East Technical University (Ranked 1st in the department and in the Faculty of Education)

Minor Degree: International Relations (2009- 2011)/Middle East Technical University

Master's Degree: English Language Teaching (2011-2014) /Middle East Technical University

PhD Degree: Curriculum and Instruction (2018-2023) /Middle East Technical University

2. Certificates Obtained

International Certificate of Teaching English: St. Giles International, London-Central / England

International Certificate of Teaching Aviation English: Anglo Continental School of English

Bournemouth/England

3. Work Experience

TED University, Ankara, Türkiye: 2013 – now → Instructor & Proficiency Exam Unit Coordinator & Team Leader

TED University Continuing Education Center, Ankara, Türkiye: 2021- now → Academic Coordinator

Maribor University, Maribor, Slovenia: 2018 → Visiting Scholar

The University of Turkish Aeronautical Association, Ankara, Türkiye: 2011-2013 → Instructor & Testing and Curriculum Office Coordinator

ANAÇEV (Anatolian Modern Education Association), Ankara, Türkiye: 2009-2010 → Teacher

Bahçelievler Anatolian Teacher Training High School, Ankara, Türkiye: 2009-2010 → Intern Teacher

Ankara Atatürk Anatolian High School, Ankara, Türkiye: 2010-2011 → Intern Teacher

HIT International Education Company, Ankara, Türkiye: 2010-2011 → Interpreter

4. Research Interests

Self-regulation, Self-efficacy, Curriculum Development and Evaluation, Comparative Studies, Testing and assessment

5. Presentations and Publications

Aydan, S. (2013, December*). Benefits and Challenges of Blogging for ELT*. 9th International METU Postgraduate Conference on Linguistics and Language Teaching. Ankara, 2013. Ankara, Gazi Publishing

Aydan, S. (2014). *Student and teacher perceptions on benefits and challenges of using blogs in English in foreign language reading classes* (Unpublished Master's thesis). METU, Ankara, Türkiye

Aydan, S. (2018). An Evaluation of Alternative Assessment from Learners' Perspective. TED University Generation Z in the Classroom Conference. Ankara, 2018. TEDU, Ankara Türkiye

Aydan, S. (2018). *An Evaluation of High School ELT Curriculum in Türkiye in terms of Students' Opinions.* An International Conference on Teaching and Learning English as an Additional Language. Belgrade, 2018.Belgrade:YDS Publication

Aydan, S. (2019). Correlation or Co-determination: An Analysis of Alternative and

Traditional Testing Employed in English Language Teaching. *International Journal of Languages' Education and Teaching.7*(1).395-410. http://dx.doi.org/10.18298/ijlet.3238

Aydan, S. & Sarıdemir, H.(2021). *A Literature Review on Curriculum Evaluation Studies Using Bellon and Handler's Evaluation Model.*The Eight International Congress on Curriculum and Instruction. Mehmet AKif Ersoy University, 2013. Ankara: Pegem Publishing.

Aydan, S. (2023). *A Comparison of Turkey and South Korea in Terms of Teacher Education.* Xth International Eurasian Educational Research Congress. Ankara 2023.Türkiye: Anı Publication

6. Awards and Honors

TÜBİTAK (The Scientific and Technological Research Council of Türkiye) – 2211 National Ph.D. Scholarship

Middle East Technical University Student Achievement –Championship Award (Ranked 1st in the department and the Faculty of Education)

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TEZİN ADI / TITLE OF THE THESIS (**İngilizce** / English): FROM LITTLE ACORNS TO MIGHTY OAKS: SELF-REGULATION STRATEGIES OF THE TOP RANKING SCIENCE HIGH SCHOOL STUDENTS IN TÜRKIYE AND FACTORS PROMOTING THE DEVELOPMENT OF THESE STRATEGIES

TEZİN TÜRÜ / DEGREE: **Yüksek Lisans** / Master ☐ **Doktora** / PhD ☒

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