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THE EFFECT OF SELF-REGULATED LEARNING ON STUDENTS' LIFELONG LEARNING AND CRITICAL THINKING TENDENCIES[1]

ÖZ DÜZENLEMELİ ÖĞRENMENİN ÖĞRENCİLERİN YAŞAM BOYU ÖĞRENME VE ELEŞTİREL DÜŞÜNME EĞİLİMLERİ ÜZERİNDE ETKİSİ

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Abstract

The main objective of this research is to determine the effect of teaching activities based on self-regulated learning on students' self-regulated learning skills, lifelong learning, and critical thinking tendencies. The study has a mixed-methods research design. Accordingly, a quasi-experimental research design was used in the quantitative part of the study. For the qualitative part, a phenomenological research design was used. The study group of the research consists of the 6th graders studying at a secondary school in Kırıkkale (Turkey). In the study conducted with two experimental and two control groups, a total of 84 students, including 21 students in each group, took part in the study. For the students in the experimental group, the lesson plans enriched with the self-regulated learning activities were implemented for eight weeks. In the control group, the lesson has been taught according to the methods stipulated by the curriculum of the lesson. In the analysis of quantitative data, one-way analysis of covariance (ANCOVA) was used, and qualitative data were analyzed by the technique of content analysis. As a result of the quantitative data analysis at the end of the application process based on self-regulated learning, a significant difference in favor of the experimental group was found in the students' self-regulated learning skills, lifelong learning and critical thinking tendencies. When the results of qualitative data analysis were considered, it was determined that the positive contribution of teaching activities based on self-regulation to students' self-regulated learning skills was also supported by student opinions. In addition, when the findings were considered in general, it was concluded that self-regulated learning contributed to students such as academic achievement, awareness, and motivation, and that some of the students began to use self-regulated learning strategies in other lessons.

Keywords*:* Self-regulated learning, *lifelong* learning tendencies, critical thinking tendencies

Öz

Bu araştırmanın temel amacı öz düzenlemeli öğrenmeye dayalı öğretim etkinliklerinin, öğrencilerin öz düzenlemeli öğrenme becerilerine, yaşam boyu öğrenme ve eleştirel düşünme eğilimlerine etkisini belirlemektir. Karma yöntemin kullanıldığı çalışmanın nicel boyutunda yarı deneysel araştırma deseni, nitel boyutunda ise olgubilim deseni kullanılmıştır. Araştırmanın çalışma grubunu Kırıkkale (Türkiye) ilindeki bir ortaokulda öğrenim gören 6. sınıf öğrencileri oluşturmaktadır. İki deney ve iki kontrol grubu ile yürütülen çalışmada her grupta 21 öğrenci olmak üzere, toplam 84 öğrenci yer almıştır. Araştırma kapsamında deney grubuna öz düzenlemeli öğrenme etkinlikleriyle zenginleştirilen ders planları sekiz hafta boyunca uygulanmış, kontrol grubu öğrencileri ise ders müfredatında öngörülen yöntemlere göre öğretim faaliyetlerini sürdürmüştür. Nicel verilerin analizinde tek yönlü kovaryans analizi (ANCOVA) kullanılmış, nitel veriler ise içerik analizi yöntemiyle çözümlenmiştir. Araştırmanın nicel veri analizi sonucunda öz düzenlemeli öğrenmeye dayalı uygulama süreci sonunda öğrencilerin öz düzenlemeli öğrenme becerileri, yaşam boyu öğrenme ve eleştirel düşünme eğilimleri üzerinde deney grubu lehine anlamlı bir farklılık ortaya çıkmıştır. Nitel veri analizi sonuçları incelendiğinde de, uygulama sürecinin öğrencilerin öz düzenlemeli öğrenme becerilerine olumlu katkı sağladığı öğrenci görüşleriyle desteklenmiştir. Ek olarak bulgular genel olarak ele alındığında öz düzenlemeli öğrenmenin öğrencilere akademik başarı, farkındalık, motivasyon artışı gibi katkılar sağladığı ve bunların yanı sıra öğrencilerin bir kısmının öz düzenlemeli öğrenme stratejilerini diğer derslerde de kullanmaya başladığı sonucuna ulaşılmıştır.

Anahtar Kelimeler: Öz düzenlemeli öğrenme, yaşam boyu öğrenme eğilimleri, eleştirel düşünme eğilimleri

[1] The research was created with data collected from the first author's doctoral dissertation in 2017. As the participants were secondary school students in accordance with the rules of the institute at that time, it was completed with the permission of the Kırıkkale Governorship Provincial Directorate of National Education dated 09.03.2018 and numbered 12774561-605.01.E.5001014, not with the approval of the ethics committee.

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Introduction

With the generalization of the concept of lifelong learning, it has become more evident how difficult to reduce learning to limited time and to limit it to certain contents is. Meeting individual learning needs, controlling the learning process, the relationship between learning and thinking are some key topics in lifelong learning (Bryce & Withers, 2003). Students need to gain a positive perspective on self-knowledge, self-confidence, perseverance and the value of learning throughout lifelong learning. Also, in this process, there is a need for self-regulation skills such as being well-organized, managing time and effort effectively, knowing when and how to get help and how to cooperate with peers, etc. (Harpe & Radloff, 2000). For this reason, lifelong learning is defined as the combination of one's desire to learn and a particular competence that requires motivation and self-regulated learning (Klug, Krause, Schober, Finsterwald & Spiel, 2014).

In lifelong learning, higher-order thinking skills also constitute another remarkable dimension. Students prepared for the 21st century will get in a learning cycle through which they improve critical thinking skills to overcome the difficulties in an in-depth learning and understanding effort (Lemke, Coughlin, Thadani & Martin, 2003). Critical thinking is the art of examination and evaluation in order to develop an idea. It is a way of thinking that evaluates information. Everyone thinks, and thinking is a natural state. Despite this, most of our thoughts are left to their own devices, devoid of purpose, simple and lacking sufficient knowledge. Critical thinking is a type of thinking that deals with events and situations with an interrogative approach and also includes the skills of evaluation, interpretation and decision-making. Critical thinking includes the processes of self-directedness, self-discipline, self-control, and self-correction (Güneş, 2012). Critical thinking is an important requirement in order to know and make sense of the universe we live in from birth to death, to realize the beauties of life and to be happy (Coşkun, 2018).Therefore, as well as learning how to learn, it is also important for the individual to have self-regulated learning skills in order to be critical, creative, constructive, problem solver and information literate (Duman, 2018: 467). In this respect, self-regulated learning is regarded as one of the key components in terms of both lifelong learning and critical thinking.

Self-regulated learning is a process in which students set their goals in the process of learning and plan by these goals, choose appropriate learning strategies, check the content of the study and evaluate the progress by predicting learning outcomes, and reflect by judging themselves on the learning difficulties they face (Cheng, 2011). Self-regulation is a self-directed process from which learners benefit in order to transform their mental abilities into academic skills and involves self-awareness, intrinsic motivation and behavioral skills to put the knowledge into practice appropriately (Zimmerman, 2002).

In both national and international research, it is known that self-regulated learning skill has considerable outcomes such as achievement (Arsal, 2010; Ataş, 2009; Bail, Zhang &Tachiyama, 2008; Bates, 2006; Bol, Campbell, Perez & Yen 2016; Cabı, 2015; Fleming, 2002; Kayıran, 2014; Vardar, 2011; Yağlı, 2014; Yıldızlı; 2015; Zheng, X & Chen, 2016), motivation (Cabı & Yalın, 2011; Eker & Arsal, 2014; Tanrıseven & Dilmaç, 2013), and positive attitude towards learning (Çatalbaş & Semerci, 2016; Çiltaş 2011; Haşlaman &

Aşkar, 2007). It is seen that educational interventions for teaching self-regulated learning strategies improve students' self-regulation skills (Dignath & Büttner, 2008). However, when the relevant researches are reviewed, it is seen that the study groups have mostly been determined at the higher education level. The studies conducted at the secondary education level, which is also the study group of this research, are generally conducted with relational survey model.

In the literature review, several studies investigating the relationship between self-regulation skills and various variables are observed (Ataş, 2009; Bates, 2006; Fleming, 2002; Güvenç, 2010; Kayıran, 2014). However, any study simultaneously investigating the effect of self-regulated learning on both lifelong learning and critical thinking tendencies at the secondary education level has not been encountered. In this sense, it is considered this study is authentic and will contribute to the field in order to reach a clearer decision related to the effect of self-regulated learning on relevant variables.

The objective of this study is to determine the effect of teaching activities based on self-regulated learning on students' self-regulated learning skills, lifelong learning and critical thinking tendencies. In line with this objective, the research questions are as follows:

1. Is there a significant difference between Self-Regulated Learning Scale posttest scores of students in the experimental groups and control groups?
2. Is there a significant difference between the Lifelong Learning Tendency Scale posttest scores of the students in the experimental groups and control groups?
3. Is there a significant difference between the UF/EMI Critical Thinking Tendency Scale posttest scores of the students in the experimental groups and control groups?
4. What are the opinions of students in the experimental group regarding the improvement of self-regulated learning skills?

Method

A mixed-methods research design was used in the study. Mixed-methods is a research approach, popularly used in the health, social and behavioral sciences, in which the researcher collects both quantitative and qualitative data to get a clear understanding of the research problems, integrates the two datasets, and then, concludes by taking the advantage of integrating these two datasets (Creswell, 2017). The quantitative dimension of the study was designed as quasi-experimental, one of the types of experimental design. A quasi-experimental design is the most commonly used design in cases where it is not possible to control all the variables and especially in educational researches (Cohen, Manion & Marrison, 2000). There are two experimental and two control groups in the research. In the experimental groups, teaching activities based on self-regulated learning were carried out. In the control groups, the lesson has been taught according to the methods stipulated by the curriculum of the lesson. Tests were conducted on both of the groups before practice (pretest) and after practice (posttest). In the qualitative dimension of the study, the "phenomenological" design was used. It is the purpose of the phenomenological research design to reveal the individuals' experiences of a specific phenomenon, perceptions toward it and the meanings they attribute to these (Yıldırım & Şimşek, 2013). The phenomenon under consideration was determined as self-regulated learning.

Study Group

For the study group of the research, the 6th graders who were studying at a public secondary school located in the city center of Kırıkkale in the academic year 2017-2018 were selected by convenience sampling that is a type of non-probability sampling. The classes in which the lessons were conducted by the same teacher were selected in order to control the difference that might arise from the teacher between groups in the research. In this regard, the classes 6A and 6B as the experimental group, and 6C and 6D were determined as the control group. Irregular students or students with frequent absence in the classes were excluded from the practice, and so, twenty-one students from the groups were included. As a result, a total of 84 students, including 21 students from each group, participated in the study. Qualitative research data were collected from the students in the experimental group. While selecting the study group for qualitative data, "maximum variation" sampling that is one of purposeful sampling methods was used.

Data Collection Tools

To collect the quantitative data, "Self-Regulated Learning Scale" developed by Öz (2018), "Lifelong Learning Tendency Scale" developed by Gür Erdoğan and Arsal (2014) and "UF/EMI Critical Thinking Tendency Scale" adapted into Turkish by Ertaş Kılıç and Şen (2014) were used. Related permissions were received from the owners of the scales. In order to collect the qualitative data, a semi-structured interview form that was prepared by the researcher was used.

Self-Regulated Learning Scale: The scale developed in a 5-point Likert-type consists of 5 sub-dimensions and 64 items. The scale includes the dimensions of studying strategies (8 items), self-evaluation (13 items), seeking help (6 items), time management and planning (8 items) and seeking knowledge (5 items).

For developing the scale, a thorough literature review was firstly carried out based on the subject area (Çiltaş, 2011; Kou, 2010; Turan & Demirel, 2010; Zimmerman & Martinez-Pons, 1986; Zimmerman, 2002) and the qualities that a student has acquired the self-regulation skill must have were tried to be specified. For the content validity of the draft scale items, opinions of four lecturers and three teachers were asked. In line with the feedbacks, necessary corrections were made and a pilot study was conducted. As a result of these studies, 17 items were eliminated from the pool of 81 items, the remaining items were revised and the 64-item draft scale was constructed. Exploratory factor analysis performed to ensure the construct validity of the scale was carried out with 532 secondary school students. To determine the suitability of the data to factor analysis, the Coefficient of Kaiser-Meyer-Olkin (KMO) 0.945 and Bartlett's test result of $\chi^2_{(532)}=7320.964$; $p<.01$ were found to be statistically significant. As a result of the repetitions in factor analysis, it was found that 40 scale items were collected under 5 factors with eigenvalues greater than 1 and the sub-dimensions together explained 44.95% of the total variance. Confirmatory factor analysis was performed for the construct validity of the scale and RMSEA=0.035, SRMR=0.048, GFI=0.88, AGFI=0.86, CFI=0.98, and NFI=0.94 were found. The EFA and CFA show that the values obtained are consistent. The Cronbach's Alpha value for the scale was calculated to be 0.93 for all items.

Lifelong Learning Tendency Scale: The scale developed by Gür Erdoğan and Arsal (2014) consists of two sub-dimensions, *"willingness to learn"* and *"openness to improvement"*, and 17 items. In order to test whether the scale developed for university students was consistent in a different sample group and with a previously proven factor-structure, confirmatory factor analysis (CFA) was again performed. Chi-square statistic of the scale applied to 461 students (χ^2=226.24, sd=103, p=.000) was found significant. When the goodness of fit indices of the model was examined, χ^2/df value was found to be 2.19. Also, for the entire scale, RMSEA=0.05, SRMR=0.049, GFI=0.94, AGFI=0.91, and CFI=0.90 were found. Considering the factor loads obtained from CFA, it is seen that the scale items confirmed the hypothesized structure by factor analysis.

UF/EMI Critical Thinking Tendency Scale: UF/EMI Critical Thinking Tendency Scale, as the Turkish adaptation study of UF/EMI Critical Thinking Disposition Instrument which was conducted by Ertaş Kılıç and Şen (2014), has 26 items and *engagement, cognitive maturity* and *innovativeness* sub-dimensions. In order to test whether the scale was consistent in a different sample group and with a previously proven factor-structure, confirmatory factor analysis (CFA) was performed. As a result of the analysis carried out with 460 students, the chi-square statistic of the model (χ^2=551.60, sd=272, p=.000) was found significant. When the goodness of fit indices of the model was examined, χ^2/df value was found to be 2.02. Also, for the entire scale, RMSEA=0.05, SRMR=0.048, GFI=0.89, AGFI=0.87, and CFI=0.91 were found. According to the results obtained from CFA, it can be said that the model for the scale consisting of 16 items and 2 sub-dimensions has an acceptable goodness of fit value.

Semi-Structured Interview Form: Interviews are conducted in order to find out the things we cannot directly observe and to reach the perspectives of other people (Patton, 2002). While preparing the interview form, the characteristics of self-regulated learners and self-regulated learning strategies in literature were reviewed and the questions were tried to be prepared at a level to be understood by secondary school students. For the 15 questions prepared, three experts in the field were interviewed and the form was restructured in line with the advice. In addition, in terms of the functionality of questions, a trial study was performed with three students and then, the actual practice was initiated over the eight questions remaining after necessary corrections were made. Before the individual interviews, the aim of the research was explained to the participants. Data were recorded by voice recorder and recording took approximately 20 minutes. The collected data were then computerized.

Implementation and Data Collection Process

The research was carried out in the second semester of the academic year 2017-2018, for the 6th graders at a public school, in English lessons and four different classes. The units of "Detectives at Work" and "Save the Planet" which were included in the 6th grade English course curriculum were selected. Lesson plans enriched with the self-regulated learning activities were implemented in an English lesson in the experimental group. The lesson has been taught according to the methods stipulated by the curriculum of the lesson. Also, the Self-Regulated Learning Scale, Lifelong Learning Tendency Scale, and UF/EMI Critical Thinking Tendency Scale were applied to both experimental and control groups before and after implementation. Interviews were conducted with the students.

Data Analysis

In comparative analyses of the data obtained through the scales, parametric test assumptions were considered at first, and then, Shapiro-Wilk test was conducted for normality of distributions. Whether there was a significant difference between the posttest scores of 84 students in experimental and control groups that were obtained on the relevant scales according to their groups was examined by one-way covariance analysis. Covariance analysis is a statistical analysis technique that aims to control of a variable or variables related to the dependent variable apart from the independent variable the treatment effect of which is tested under study (Büyüköztürk, 2007). It is possible to regard covariance analysis as a combination of regression analysis and analysis of variance. Therefore, it is required for both techniques to meet their criteria and assumptions (Can, 2014). Accordingly, it was examined whether the dataset met the necessary conditions for one-way analysis of covariance and has been verified.

In the research, content analysis was used for the interviews performed to determine the perceptions of students in the experimental group on self-regulated learning. The main purpose of content analysis is to reach concepts and relationships that can explain the data (Yıldırım & Şimşek, 2013). Content analysis can be carried out in two ways. In the first, categories are identified based on prior knowledge, theory and experiences about the subject before starting the analysis; however, in a second way, categories reveal while the analysis continues (Fraenkel, Wallen & Hyun, 2012). In this research, the first approach was adopted in the content analysis since a detailed theoretical framework related to the self-regulation concept could be reached. The steps followed in the qualitative research dimension of this study are presented below.

Computerization of Data: The data collected by a voice recorder during a preliminary interview and final interview were computerized.

Arranging Data: The students interviewed were named as S1, S2, etc. To these names, the letter P in case of being preliminary interview data and the letter F in case of being final interview data were added.

Identifying Categories: While identifying the categories for qualitative data analysis, the strategies developed by Zimmerman and Martinez-Pons (1986) were taken as a basis. Qualitative data were examined in the categories of self-evaluation, keeping records and monitoring, seeking help, goal-setting and planning, environmental structuring, and seeking information.

Creating Sub-categories: The answers given to each question in the semi-structured interview form were grouped and the sub-categories were created after the resulting texts were read several times. The sub-categories emerging at this stage of the analysis were revised and restructured to make them more meaningful. As a result, sub-categories such as the use of these strategies by students, details about the strategies, effects of the strategies on a student after implementation, and the use of learned strategies in other lessons were determined within the scope of identified categories.

Creating Codes: In the process of coding, the dataset was read a few times and student opinions were tried to be coded with the most appropriate expression regarding the categories. Then, all coding was performed one more time by an independent researcher in the process of analysis, and by comparing the findings, consistency was tried to be achieved. In addition, the expert opinion was received in line with the findings in order to see whether the codes represented the sub-categories. Based on the feedbacks, coding was revised. Also, the Percentage of Agreement = (Consensus (Na) / (Consensus (Na) + Divergence)) x 100 formula, as developed by Miles and Huberman (1994), was used to determine the reliability of the research. Accordingly, the ratio of agreement between the two coders was calculated at 0.92. When the percentage of agreement is 70% and above regarding the assessment made by the expert and the researcher for reliability in qualitative researches, reliability is ensured (Miles & Huberman, 1994).

Reporting Findings: While reporting the determined sub-categories and codes, it was tried to identify the data and to present this information in relation to each other according to the resulting concept or theme (Yıldırım & Şimşek, 2013). For this, while creating the category and code tables, findings for a preliminary interview (f1) and final interview (f2) were presented together and thus, the treatment effect of the experimental process on students were examined. In order to support the findings, selected student expressions were presented through direct quotations.

Findings

Findings for Self-Regulated Learning

Adjusted mean scores of students in the experimental group on Self-Regulated Learning Scale after implementation were calculated $\bar{x}$ =4.25, and $\bar{x}$ =3.70 for the control group. The results of the analysis of covariance (ANCOVA) conducted to see whether the difference between adjusted means was significant were presented in Table 1.

Table 1. Results of the Covariance Analysis for Self-Regulated Learning Scale

Source of Variance	Sum of Squares	sd	Mean Square	F	Level of Significance
Pretest	6.185	1	6.185	346.307	.000
Group	6.288	1	6.288	352.093	.000
Error	1.447	81	.018		
Total (Adjusted)	14.417	83			

According to the Table 1, there is a significant difference between the posttest mean scores when the pretest scores of the groups are taken under control [$F_{(1-81)}$= 352.093; p<.05]. According to this finding, the scores that students in the experimental group obtained on the Self-Regulated Learning Scale increased significantly at the end of implementation.

Findings for Lifelong Learning Tendencies

Posttest means adjusted for Lifelong Learning Tendency Scale pretest scores of the groups were calculated 4.05 in the experimental group and 3.76 in the control group. Considering adjusted means, it is seen that the adjusted mean scores of the experimental group are higher. Whether this difference between groups was significant was tested by the analysis of covariance (ANCOVA) and relevant results were presented in the table below.

Table 2. Results of the Covariance Analysis for Lifelong Learning Tendency Scale

Source of Variance	Sum of Squares	sd	Mean Square	F	Level of Significance
Pretest	8.793	1	8.793	306.105	.000
Group	1.412	1	1.412	49.151	.000
Error	2.327	81	.029		
Total (Adjusted)	11.120	83			

According to Table 2, there is a significant difference between the posttest mean scores when the Lifelong Learning Tendency Scale pretest scores of the groups are taken under control [$F_{(1-81)}$=49.151; p<.05]. According to this finding, teaching activities based on self-regulated learning resulted in a significant increase in students' lifelong learning tendencies.

Findings for Critical Thinking Tendencies

UF/EMI Critical Thinking Tendency Scale posttest mean scores of the groups were calculated $\bar{x}$=4.09 for the experimental group and $\bar{x}$=3.82 for the control group. Considering adjusted means, it is seen that the adjusted mean scores of the experimental group are higher. The results of the analysis of covariance (ANCOVA) conducted to see whether the difference between adjusted means of the groups was significant were presented in Table 3.

Table 3. Results of the Covariance Analysis for UF/EMI Critical Thinking Tendency Scale

Source of Variance	Sum of Squares	sd	Mean Square	F	Level of Significance
Pretest	13.299	1	11.299	1590.239	.000
Group	1.430	1	1.430	171.054	.000
Error	.667	81	.008		
Total (Adjusted)	14.283	83			

According toTable 3 there is a significant difference between the posttest mean scores when the pretest scores of the groups obtained on the scale investigating critical thinking tendencies are taken under control [$F_{(1-81)}$=171.054; p<.05]. This finding shows that teaching activities enriched with self-regulated learning resulted in a significant increase in students' critical thinking tendencies.

Student Opinions on Self-Regulated Learning

Data were collected in the categories of self-evaluation, keeping records and monitoring, seeking help, goal-setting and planning, environmental structuring, and seeking information. Sub-categories and codes related to the use of self-regulated learning strategies by students, details about the strategies, contributions of the strategies to the student after implementation, and the use of learned strategies in other lessons were created.

Table 4. Opinions of the Students on Self-Evaluation

Category	Sub-Category	Code	f1	f2
Self-Evaluation	Evaluating Oneself	Not evaluating oneself	6	1
		Sometimes evaluating oneself	3	3
		Evaluating oneself	3	8
	Contribution of the Strategy to Student	Recognizing the Missing Points		9
		Ensuring Planned Study		7
		Increasing the Level of Achievement		6
		Ensuring Goal-Setting		3
		Improving Self-Confidence		3
		Increasing Willingness to Learn		2
	Using the Strategy in Other Lessons	Using		6
		Using sometimes		3
		Not using		3

Based on Table 4, the sub-categories of evaluating oneself, the contribution of the strategy to the student and using the strategy in other lessons are apparent. Before implementation, six students expressed that they did not evaluate themselves during learning activities. Also, three students stated that they sometimes made self-evaluations and three students expressed that they usually evaluated themselves. After implementation, one student stated that he/she did not evaluate himself/herself in learning activities. Also, three students expressed that they sometimes evaluated themselves and eight students expressed that they usually evaluated themselves.

"According to the grades I get in written exams, I know about which points I have missed in the lessons and accordingly I think what I would do if I were not successful." P-S1

"I have learned to evaluate myself." F-S4

After implementation, students were asked for their opinions on the contribution of self-evaluation to them and the use of self-evaluation strategy in other lessons. Nine students considered that self-evaluation had a positive effect on recognizing the missing points, and seven students also regarded self-evaluation positively related to the planned studying in line with the points they missed during their lessons. Six students emphasized that they could increase their levels of achievement by using this strategy in other lessons. Additionally, six students in the experimental group expressed that they benefited from the self-evaluation

strategy in other lessons. Three students in the group stated that they sometimes used the strategy while three students expressed that they did not use it. A student opinion regarding this is as follows:

"I evaluate myself in other lessons. In this way, I can see better what I need to do. Self-evaluation lets me study well and systematically for all lessons. It is of use to me in every lesson." F-S4

Related to the category of keeping records and monitoring, students in the experimental group were asked for their opinions.

Table 5**.** Opinions of the Students on Keeping Records and Monitoring

Category	Sub-Category	Code	f1	f2
Keeping Records and Monitoring	Note-Taking During Lessons	Not taking notes	9	5
		Sometimes taking notes	3	4
		Taking notes		3
	Note-Taking During Self-Studies at Home	Summarizing	8	9
		Underlining the Important Points	4	4
		Writing on Mini Colored Notebooks	2	3
		Keeping a Log of Study		2
	Updating the Records	Revising the Notes	5	6
		Organizing the Notes	2	5
		Making Additions to the Notes	1	2
	Contribution of the Strategy to Student	Ensuring Effective Learning		9
		Increasing the Level of Achievement		8
		Preventing Distraction During Lessons		8
		Reviewing the Course Subject while Organizing the Notes		5
		Creating a Learning Material Source while Revising the Lesson Content at Home		3
		Outlining the Course Subject		1
	Using the Strategy in Other Lessons	Using sometimes		5
		Not Using		4
		Using		3

According to Table 5, student opinions on keeping records and monitoring strategies were collected under the sub-categories of note-taking during lessons, note-taking during self-studies at home, updating the records, contribution of the strategy to the student and using the strategy in other lessons.

In the preliminary interview, regarding the sub-category of note-taking, nine students expressed that they did not take notes during lessons and three students stated that they sometimes took notes. In the final interview, not taking notes was stated by five students.

Also, four students expressing that they sometimes took notes and three students expressing that they did note-taking during lessons were observed.

"The most useful thing in these two units is "note-taking". Truth to tell, I listen to the teacher, and write down while listening and rehearse when I come home. For me, it works a lot." F-S2

Regarding the sub-category of note-taking during self-studies at home, in the preliminary interview, eight students stated that they summarized the course subject. Four students expressed that they underlined the important points and two students mentioned that they wrote the important points related to the course subject down on small, colored note papers and hung them. In the final interview, nine students expressed that they summarized the course subject. Four students stated that they underlined the important points and three students expressed that they took notes on small, colored papers. Also, two students expressing that they started to keep a log of the study were observed.

"Generally, I take notes while studying at home. This is also something like a summary of the subject." P-S7

"I have started to write down the names of the subjects taught daily. Actually, I was keeping a log but I was not used to taking notes related to the lessons taught. Now, I write the course subjects taught, and what we have learned during lesson down." F-S1

For the sub-category of updating the records, in the preliminary interview, it was stated by five students that they reviewed their notes before exams. Also, two students stated that they made a clean copy by writing the notes they took during the lesson again at home. One student mentioned about making additions to the notes taken. In the final interview, the number of students reviewing their notes later was found to be six. The number of students organizing the notes they took during lessons again at home was five and the number of students making additions to the notes they took was two.

"I look over my notes before written exams. So, not only I make a review, but also they remain in my mind." P-S3

For the sub-category of the contribution of keeping records and monitoring strategy to the student, nine students expressed that note-taking ensured effective learning for them. Also, eight students stated that note-taking increased the level of their achievement in lessons. Eight students expressed that taking notes during lessons prevented their distraction in lessons.

"I divide the paper as our teacher has taught us. In order not to skip anything about the subject, to write the details down, I always follow, to be more exact. In this way, I am not distracted. I sometimes have my mind on other things when I do not take notes." F-S4

Regarding the seeking help strategy, data obtained from students in the experimental group were collected under the sub-categories of the status of seeking help, sources of help-seeking and the situation for which help is sought. The following findings were reached.

Table 6. Opinions of the Students on Seeking Help

Category	Sub-Category	Code	f1	f2
Seeking Help	Status of Seeking Help	Seeking Help	9	10
		Sometimes Seeking Help	2	2
		Not Seeking Help	1	
	Sources of Help-Seeking	Internet	12	12
		Family	8	9
		Source Books	7	7
		Friends	3	5
		Teacher	1	5
	The Situation for which Help is Sought	Difficult Homework	10	10
		Incomprehensible Subjects	8	9
		Unsolvable Problems/Questions	8	8
		Unknown Words	6	9
		Curiosity		5

According to Table 6, related to the status of seeking help sub-category, nine students expressed that they sought help during learning activities. Also, two students expressing that they sometimes sought help and one student mentioning about not seeking help were observed. In the final interview, while ten students stated that they sought help, two students expressed that they sometimes sought help. Regarding the sub-category of sources of help-seeking, in the preliminary interview, all of the twelve students referred to the internet as the source by which they sought help. Additionally, the sources of help-seeking for learning activities were expressed as a family by eight students, as sourcebooks by seven students, as friends by three students and as a teacher by one student. In the final interview, all of the twelve students stated that they used the internet as the source of help-seeking. The family was referred to as the source of help-seeking by nine students. The number of students referring to the sourcebooks was seven. There were also five students mentioning about friends and five students mentioning about the teacher as the help-seeking source.

Ten students stated that they sought help for difficult homework, eight students for incomprehensible subjects, eight students for the questions or problems they could not solve, and six students for the words the meaning of which they did not know. In the final interview, the situation for which help was sought was stated as difficult homework by ten students, the subjects too difficult to comprehend by nine students, the problems and/or questions too difficult to solve and/or answer by eight students, and the subjects they were curious about by five students.

"Internet is the source from which I get help at most. I immediately watch the videos related to the topics I cannot understand. If I have homework, I ask my family for help." P-S5

"A few friends of mine, I ask the points I cannot understand to them, and they tell me. For example, we studied together on a project paper the other day, I had not understood the topic till then. While studying there, they explained to me and I understood. Sometimes, I also explain the subject. That day, there was another subject they could not understand, and I told it to them." P-S3

"I liked the activity of studying with the teacher much. Before now, I did not use to ask teachers. Now, I can ask. But, I sometimes abstain from asking for fear that they get angry. Studies in groups were entertaining. I wish we could study together in each lesson." F-S4

The category, sub-category, code and frequency distribution of the answers given by the students regarding the category of goal-setting and planning were presented below. Accordingly, in the interviews with students, their opinions on goal-setting and planning strategy were collected under the sub-categories of goal-setting status, determining learning strategy, planning the time, the contribution of the strategy to a student, and using the strategy in other lessons.

Table 7. Opinions of the Students on Goal-Setting and Planning

Category	Sub-Category	Code	f1	f2
Goal-Setting and Planning	Status of Goal-Setting	Not Setting a Goal	9	5
		Setting a Goal	2	5
		Sometimes Setting a Goal	1	3
	Determining Learning Strategy	By Writing	8	8
		By Watching Videos Related to the Subject on the Internet	8	8
		By Reading	2	2
		By Explaining the Subject to Friends		4
	Planning	Sometimes Following the Study Plan	5	3
		Following the Study Plan	3	8
		Not Following the Existing Study Plan	3	2
		Studying Irregularly	3	2
	Contribution of the Strategy to Student	Ensuring to Have a Full Knowledge of the Course Subject / Topic		7
		Promoting Self-Evaluation		5
		Increasing the Interest in Lesson		5
		Increasing the Level of Achievement		5
		Improving Self-Confidence		2
	Using the Strategy in Other Lessons	Using		3
		Using sometimes		3
		Not using		3

Based on Table 7, it was found that nine students did not set a goal before starting to study, two students set a goal and one student sometimes set a goal before studying. In the final interview related to the status of goal-setting, it was observed that five students set a goal, five students did not set a goal and three students sometimes set a goal before starting learning activities.

"I think about what I will do before I start to study, and I make a plan accordingly." P-S2

About determining the learning strategy, in the preliminary interview, learning the subject better by writing was stated by eight students, learning the subject better by watching videos on the internet was stated by eight students, and learning the subject better by reading was emphasized by two students. In the final interview, unlike these findings, four students expressed that they learned the subject better by explaining it to their friends.

"I learn better when I tell someone. I both review the subject and feel like a teacher. Sometimes they explain the subject to me. That's also good for me. I wish the desks and chairs remained in the same position, as it is in the group study." F-S1

In the preliminary interview related to planning the time, five students stated that they sometimes studied by following a plan. Also, it was stated by three students that they had their study plans and followed those plans regularly. Three students expressed that they did not study by following a plan. After implementation, it was observed that eight students were expressing that they studied in a planned way, three students expressing that they sometimes followed a study plan, two students expressing that they did not follow a plan for studying, and two students expressing that they studied irregularly.

"The (smart) wristband app enabled me to study in a planned way. Sometimes I could not observe, but I set daily schedules. That enabled me to level my studies up." F-S2

Considering the contribution of a goal-setting strategy to the student, it was determined that the use of the strategy by seven students enabled them to have full knowledge of the course subjects. In regard to promoting self-evaluation and increasing the interest in the lesson and level of achievement, the number of students indicating the positive effect of the strategy was five per each code. Also, two students expressed that self-confidence could be improved by employing the strategy. For using the goal-setting and planning strategy in other lessons, using the strategy, sometimes using it and not using it were mentioned by three students per each.

"For other lessons, I started to think about what we would write in the purpose section if we filled a form in that lesson. I am trying to find it." F-S4

Students in the experimental group were asked for their opinions about the use of environmental structuring strategy and the following findings were reached.

Table 8. Opinions of the Students on Environmental Structuring

Category	Sub-Category	Code	f1	f2
Environmental Structuring	Study Environment	A silent environment	12	12
		In his / her room	8	6
		Makes no difference	4	2
	Preparation	Preparing the desk	8	9
		Preparing the necessary books, notebooks, etc.	7	7
		Checking necessary materials		6
		Preparing notebook/paper for note-taking		4
		Preparing a study plan		4

According to Table 8, student opinions on environmental structuring were collected in the study environment and preparation sub-categories. Based on the findings from the preliminary interview, all of the students stated that they studied in a silent environment. While eight students stated that they could study only in their rooms, four students expressed that they did not set a specific criterion at that point. In the final interview, all the students stated that they studied in a silent environment and six students mentioned studying in their rooms.

In the preliminary interview regarding preparation for study, eight students said that they started studying after they had arranged their desks, and seven students said that they first prepared the necessary books and notebooks. In the final interview, regarding the preparation for studying, it was stated by nine students that they arranged the desk for studying, by seven students that they prepared the necessary books/notebooks, by six students that they checked the necessary materials for studying, by four students that they prepared sheets and/or blank papers for note-taking, and by four students that they prepared a study plan.

"I prepare the necessary book and notebooks for whatever I'll study, and then I start." F-S10

Students were asked for their opinions about seeking information strategy before and after the implementation.

Table 9. Opinions of the Students on Seeking Information

Category	Sub-Category	Code	f1	f2
Seeking Information	Source of Information	Internet	12	12
		An Adult	5	5
		Books	4	6
		Journals	1	3
	Reason of Seeking-Information	Homework	12	12
		For Written Exams/Tests	8	8
		Curiosity	3	8
		For interests		4

During the preliminary interviews, for the source of information sub-category, the source was referred to as the internet by twelve students, an adult by five students, books by four students, and journals by one student. In the final interview, regarding the source of information, the number of students was twelve for the internet, six for books, five for an adult, and three for journals.

For the sub-category of seeking information, the reason why students sought information was stated as homework by twelve students, as written exams and tests by eight students, as the topics they were curious about by three students. In the final interview, twelve students stated that they sought information for their homework. Seeking information due to curiosity and for exams was stated by eight students per each. Also, four students said that they sought information for their interests.

"Learning begins with curiosity. I explore the issues I am curious about. I search the internet or ask my family if they do not know, we may search together from books. Apart from this, I can do some search while studying for my homework or written exams. If I cannot find it, I will ask my elders." F-S9

Conclusion, Discussion and Suggestions

It was concluded that the implementation carried out in the experimental group contributed to the students' self-regulated learning skills. The positive effect of the experimental process on students' self-regulated learning skills is also supported by the opinions of students. Findings revealed that students used self-evaluation, keeping records and monitoring, goal-setting and planning, environmental structuring, and seeking information strategies more after the experimental process when compared to before implementation. When student opinions are evaluated in general, it is seen that self-regulated learning makes some important contributions to students in terms of academic achievement, awareness, increased motivation. Besides, it was found that some of the students started to use self-regulated learning strategies in other lessons.

The results of the research correspond to the findings of similar researches in domestic and foreign literature (Arsal, 2009, Kang, 2010, Kimber, 2009, Pape & Wang, 2003, Yetkin, 2006, Yetkin-Özdemir & Pape, 2012). For instance, in the research within the scope which Van Grinsven and Tillema (2006) investigated the relationship between effective learning environments promoting self-regulated learning and self-regulated learning strategy, it was revealed that students actively participated in lessons in the environments where self-regulated learning was promoted and their motivation levels increased in addition to the improvement of their self-regulated learning skills. Similarly, Camahalan (2006) concluded that education and training activities through which students were provided with the opportunity of learning and choosing self-regulated learning strategies had a positive effect on students' self-regulated learning levels and academic achievements. Also, Yıldızlı (2015) investigated the effect of self-regulated learning environments and teaching activities on the academic achievement of students in mathematics class, their attitudes towards mathematics and self-regulation skills and determined that there was a significant difference in favor of the experimental group as the result of research.

In this research, multiple strategies teaching through lesson plans enriched with self-regulated learning activities were aimed, strategies and task plans were explained to the students, and the students were informed about the objectives throughout the implementation. De Boer, Donker-Bergstra, Kostons, Korpershoek and Van der Werf (2013) investigated which intervention would be more effective on self-regulated learning in the meta-analysis within the scope of which they examined 95 studies. The studies included in the analysis were coded by considering 14 learning strategies, subject fields, assessment instruments used,

characteristics and course grade levels of participants, practitioners of the interventions, whether computers were used, whether there was a collaboration among students during the interventions and length and depth of the interventions. In this study mentioned, it was concluded that teaching students when, why and how to use self-regulated learning strategies and explaining to them how to plan a learning task and the importance of the task in detail had a great influence on student academic performance. Similarly, Hattie et al. (1996), in their meta-analysis study, determined that interventions for self-regulated learning including multiple strategy instruction had a greater effect in terms of increasing student performance than the interventions to teach a small number of strategies.

In this research, one of the elements put into practice to develop self-regulated learning strategies as multiple for students was "Self-Regulated Learning Form". In the interviews made with the students, it was determined that the form filled in both at the beginning and end of the lesson was effective in terms of the acquisition of strategy. The form particularly contributed to keeping records and updating strategy. Also, it allowed students to raise awareness on self-evaluation, environmental structuring, setting goals, organizing and transforming strategies. In the literature, studies are indicating that using a similar form or keeping a log of the study were quite effective in developing self-regulated learning skill (Arsal, 2009; Eker & Arsal, 2014; Güvenç, 2010; 2011). Moreover, Yıldızlı (2015) stated that students' keeping a record of their mistakes later prevented them from making the same mistake in similar cases and enabled them to act consciously.

Consequently, creating opportunities for teaching self-regulation strategies is an important factor in developing self-regulated learning skills of students. In line with similar research results in the literature, this research also proved that teaching activities enriched with self-regulated learning activities had positive effects on students' self-regulated learning skills.

When the Lifelong Learning Tendency Scale pretest scores of the students in experimental groups for which lesson plans enriched with the self-regulated learning activities were implemented and in control groups for which traditional teaching method was followed were taken under control, a significant difference between the posttest scores of the groups was found in favor of the experimental group.

In the literature, researches are having reached similar results. For instance, in the research carried out by Ng (2016), it was revealed that students with a high level of self-regulation had more self-esteem, less anxiety, more self-regulation and less procrastination and were more self-motivated to learn. Also, the research reveals that a student with a lifelong learning skill exhibits an active self-regulated learner profile.

Nicols (2009) argues that students who have self-regulated learning skills can become more effective autonomous learners, which is the basis of lifelong learning. Demirel (2017) also states that lifelong learning serves four types of the student (those who learn through induction and invention, those who want to organize their learning by themselves, those who need guidance and want an individualized education program and those who want to learn in a group) and one of these student types is self-regulated learners. Similarly, according to Deveci and Ayish (2017), Lamar and Lodge (2014), and Clore and Palmer (2009), if students are supposed to become reflective, independent and self-regulated individuals who can interpret, analyze, evaluate and explain, their lifelong learning and critical thinking skills are necessary to be improved. According to Zimmerman (1989), self-regulated learning is that the learner can control his knowledge and/or skills which he has gained through his own thought and behaviors, and this feature provides a basis for lifelong learning. In a similar vein,

Cornford (2002) also pointed out that using self-regulated learning strategies enables students to take more responsibility in terms of their learning and to become lifelong learners.

According to Bryce (2006), lifelong learning requires a continuous process of inquiring, and in this process, it makes the individual willing to search for the new information by keeping his curiosity and interest alive. Based on this, it can be said that cognitive and affective elements are predominant in the characteristics of a lifelong learner. In fact, as the characteristics of lifelong learners, cognitive features such as information literacy, learning to learn, self-regulation skills and so on, and effective features such as a desire for continuous learning, motivation, curiosity, etc. are emphasized (as cited in Demiralp, 2016). McCormick (2006) also defines learning to learn which is of the key concepts of lifelong learning as knowledge of cognition and mechanisms of self-regulation (as cited in Hoskins & Fredriksson, 2008).

Another finding supporting the results of this research is that self-regulation skill or the concepts closely related to self-regulation skills are included in the sub-dimensions resulting from the data collection tools used to measure lifelong learning competence (Coşkun & Demirel, 2009; Şahin, Akbaşlı & Yanpar Yelken, 2010; Uzunboylu & Hürsen, 2011).

The fact that lifelong learning and self-regulation include some common components may also indicate that there is a relationship between these two concepts. The first of these common components have been identified as *metacognition*. According to Paris and Winograd (1990), metacognition contains the individual's knowledge about his thinking. As it is cited by Coşkun (2009), Harpe and Radloff (2000) state that cognitive, metacognitive, motivational and affective characteristics are all important in lifelong learning.

According to Pintrich (1993), prior cognitive knowledge and metacognitive knowledge are used on the forethought, planning and activation phases of self-regulation. In other words, self-regulated learners usually activate their knowledge through self-suggestion and by asking themselves questions (e.g. What do I know about this?) in a planned manner. Activation of metacognitive knowledge can occur automatically or through deliberate conscious control which includes procedural knowledge and conditional knowledge (Schunk, 2005).

Another common component included by lifelong learning and self-regulated learning has been identified as *motivation.* Günüç, Odabaşı and Kuzu (2012) stated that there are many factors such as skill, competence, age, motivation, attitude, literacy, information and communication technology, politics, economics, experience, learning by having fun, and role model so that the individual can succeed in lifelong learning and actualize lifelong learning. Under the influence of these factors, the lifelong learning development of the individual is enabled. Yılmaz and Kaygın (2018) also investigated the relationship between lifelong learning tendency and motivation for success. According to the obtained findings, there is a low-level positive relationship between the lifelong learning tendency and motivation for success scores of the subjects. In addition, the two determinants for successful lifelong learning are often mentioned in literature. These are 1) motivation and interest in learning (motivation to learn) and 2) competence to implement this successfully in concrete situations of learning (Finsterwald, Wagner, Schober, Lüftenegger & Spiel, 2013; Pintrich & de Groot, 1990; Weinstein & Hume, 1998). Self-regulated learning and motivation show a clear overlap in the literature (as cited in Demiralp, 2016).

Self-efficacy is one of the important components of self-regulation and the concept of perseverance as one of the important constituents of lifelong learning has been identified as concepts with close meaning. According to Coşkun (2009), perseverance refers to one's self-belief in learning and constant attitude which he or she will display to realize this belief. This

situation was regarded as self-efficacy by Bandura (1986) and defined as the individual's own judgment about his or her capacity to organize the activities required for displaying a certain performance and to perform it successfully.

In another respect, it is seen that self-directed learning which is an important aspect of lifelong learning and self-regulated learning are the concepts having close meanings. Considering the relationship between self-directed learning and self-regulated learning, it turns out that it is very difficult to distinguish these concepts by drawing a sharp boundary. As a matter of fact, these concepts are used either as synonymous or interchangeably by many researchers in the literature (Bolhuis, 2003; Boekaerts & Corno, 2005; Garrison, 1997; Schreiber, 1998; Dinsmore, Alexander & Loughlin, 2008).

Confusion about the terms can be related to the use of self-directed learning in the context of adult education and the use of self-regulated learning in the context of lifelong learning, in general. As well, it can result from the fact that the definitions of terms are used interchangeably. Winne and Hadwin (1998) determined the four basic phases of self-directed learning in academic learning situations as follows: 1) Task definition, 2) Goal setting and planning, 3) Implementing studying tactics and strategies, and 4) Adaptation of studying to metacognition. However, Pintrich (2010) listed the same expressions for self-regulated learning as the following: 1) Planning and goal setting, activation of perception and knowledge related to the task and context, 2) Monitoring processes representing the metacognitive awareness of different aspects of self, task or context, 3) Efforts to organize and control the different aspects of self, task or context, 4) Reactions and reflections on self, task or context. When trying to list the similarities of the concepts, active participation and goal-oriented behavior should be stated at first. Similarities remain with goal setting and task analysis, the realization of plan and self-evaluation of the learning process. Also, the two concepts activate metacognitive skills and intrinsic motivation is emphasized as a key component in both cases. Similar to self-directed learning, self-regulated learning also takes place as a combination of internal and external factors (Saks & Leijen, 2014).

Consequently, compulsory education is the basis of lifelong learning and therefore, students must actively participate in their own education and planning process. Schools must bring learning skills to ensure lifelong learning (Erdamar, 2017). One of the skills to ensure this gain is seen as self-regulated learning.

At the end of the experimental implementation process, when the UF/EMI Critical Thinking Tendency Scale pretest scores of the groups were taken under control, a significant difference between the posttest adjusted mean scores of the groups were found in favor of the experimental group.

In literature, it is possible to find the studies that establish a relationship between self-regulation and critical thinking (Garett & Wulf, 1978; Gürçay & Ferah, 2018; Facione, 1990; Kuiper, 2002; Schraw et al., 2006; Phan, 2006; 2009; Peters & Kitsantas; 2010). For instance, Kreber (1998), by investigating the relationship between students' willingness to participate in self-regulated learning and capacity of perception towards it and their critical thinking abilities, revealed a significant relationship between self-regulated learning and critical thinking in her study. Similarly, according to the theoretical analysis conducted by Phan (2010), various cognitive strategies in self-regulation play an important role as a sub-process that can allow critical thinking to transform students' mental abilities into performance results. Moreover, according to the researcher, critical thinking functions as a cognitive self-regulation strategy that students use in their learning and maybe a product of different self-regulation strategies.

In some other researches, this relationship between critical thinking and self-regulated learning is seen to be established indirectly. For example, according to Zimmerman, Bandura and Martinez-Pons (1992), students' self-regulated learning skills enhance their perceived self-efficacy for academic achievement. To enhance the academic self-efficacy positively affects the academic goals and academic achievements which are identified by students for themselves. Another predictor of academic achievement is a critical thinking ability. It is known that there is a positive relationship between academic achievement (Ip et al., 2000; Phan, 2009) and critical thinking skills which promotes students' motivation in teaching and learning processes (Phan, 2010). The process of evaluating and improving critical thinking skills and self-regulated learning skills brings academic achievement to students (Phan, 2006). According to this, it is proposed that students who have high critical thinking dispositions are more successful than students with low critical thinking dispositions (Akbıyık & Seferoğlu, 2002).

With self-regulated learning, using critical thinking skills together with metacognitive, motivational and behavioral activities for the learning process is expressed (Schunk & Zimmerman, 1994). In this sense, effective self-regulation requires using metacognitive critical thinking strategies reflectively with a reliable experiential knowledge base and to understand social and cultural effects regarding the learning process well (Kuiper, 2002).

Goal setting, one of the important elements of the self-regulated learning process, also contributes positively to critical thinking skills. According to Phan (2009), findings obtained from the researches in the literature show that goal setting has a positive effect on critical thinking. Therefore, students who pursue their goals tend to think critically. The reason is that a reflection of goals facilitates a better understanding of knowledge and developing skills. Thus, goal setting studies included in the implementation process of this research may have also contributed to students' critical thinking tendencies. According to Facione (1998), the most considerable cognitive skill in critical thinking is self-regulation because self-regulation allows a good critical thinker to improve their own thinking. But, another level does not completely cover it since self-regulation is the one looking back at all dimensions of critical thinking and checking oneself twice (as cited in Demir, 2006).

Self-regulation activates the one's effort to initiate a critical thinking process. Dewey (1933) stated that self-regulation enabled the one to take action in order to change the aspects of his own critical thinking continuously. Also, self-regulation enables managing cognitive strategies better and coordinating the sources of learning. The more self-regulated a student becomes the more critical thinker he becomes, or vice versa (Lee, 2009). Schraw et al. (2006), while explaining the components of self-regulated learning, identified one of its sub-components as critical thinking. According to the researchers, self-regulated learning consists of cognition, metacognition and motivation components, and the cognition component of self-regulation includes critical thinking that consists of identifying and analyzing sources and concluding.

Motivated Strategies for Learning Questionnaire (MSLQ) designed by Artino in 2005 is divided into two main categories as motivation and use of learning strategies for self-regulation. One of the five-item sub-dimensions of the learning strategies section is critical thinking. Similarly, one of the sub-dimensions of the instrument prepared by Demir (2006) to measure critical thinking is also self-regulation.

It can be stated that critical thinking and self-regulated learning have common components such as metacognition and motivation. According to Lai (2011), critical thinking skills are related to many other significant learning outcomes as metacognition, motivation, collaboration and creativity. Metacognition supports critical thinking by virtue of the fact that

students who can monitor and evaluate their own thinking processes are more likely to think effectively. Additionally, one's ability to critically evaluate his arguments and reasoning is essential for self-regulated learning. Motivation supports critical thinking as students who are motivated to learn are more likely to maintain the tasks that require critical thinking. In addition to this, learning activities and evaluation tasks that all require critical thinking can increase student motivation. Moreover, students with critical thinking dispositions like the desire to consider different perspectives can collaborate better and the opportunities provided to make collaborations can promote thinking at a higher order. Motivation is also one of the important components of self-regulated learning. Thus, it is thought that the activities to increase motivation which is included in the implementation process of this research have also contributed to the students' critical thinking tendencies.

As a result, of this research; it is seen that the self-regulated learning process has positive effects on lifelong learning and critical thinking tendencies. Therefore, self-regulated learning can be used to increase secondary school students' lifelong learning and critical thinking tendencies and to enhance their self-regulated skills. The effects of self-regulated learning on other 21st century skills may be examined at different grade levels. Regarding another study to be conducted in this field, a longitudinal study can be carried out to investigate the effect of the program applied. Action researches that will allow examining the changes regarding students' use of self-regulation skills more comprehensively may be designed.

References

Akbıyık, C. & Seferoğlu, S. S. (2002). Eleştirel düşünme eğilimleri ve akademik başarı [Critical thinking dispositions and academic achievement]. *Çukurova Üniversitesi Eğitim Fakültesi Dergisi. 3*(32), 90-99.

Arsal, Z. (2009). Problem çözme stratejilerinin problem çözme başarısını yordama gücü. [Prediction level of problem-solving strageties on problem solving performance]. *Abant İzzet Baysal Üniversitesi Eğitim Fakültesi Dergisi, 9*(1), 103-113.

Artino, A. R. (2005). Review of the motivated strategies for learning questionnaire. Retrieved from http://www.eric.ed.gov/ERICWebPortal/detail?accno=ED499083.

Ataş, İ. (2009). *Öz düzenleyici öğrenme stratejileri kullanımının ilköğretim okulu dördüncü sınıf öğrencilerinin matematik dersindeki öz yeterlik algısına ve başarısına etkisi [The effect of self-regulated learning strageties on the fourth grade primary students' perception of self efficacy and success on maths Lesson]*. (Unpublished master's thesis). Gazi University, Ankara

Bail, F. T., Zhang, S., & Tachiyama, G. T. (2008). Effects of a self-regulated learning course on the academic performance and graduation rate of college students in an academic support program. *Journal of College Reading and Learning*, *39*(1), 54-73.

Bates, C. H. (2006). *The effects of self regulated learning strategieson achievement, control beliefs about learning and ıntrinsicgoal orientaton*. A Dissertation University of South Alabama. UMI 3218874

Bol, L., Campbell, K. D., Perez, T., & Yen, C. J. (2016). The effects of self-regulated learning training on community college students' metacognition and achievement in developmental math courses. *Community College Journal of Research and Practice, 40*(6), 480-495.

Bryce, J. and Withers, G. (2003). *Engaging secondary school students in lifelong learning*. ACER: Australian Council for Educational Research.

Büyüköztürk, Ş. (2007). *Sosyal bilimler için veri analizi el kitabı* [Handbook of data analysis for social sciences] (7.Baskı). Ankara: Pegem Akademi.

Cabı, E. & Yalın, H. I. (2011). Öz düzenlemeye dayalı karma öğrenimin öğrenci motivasyonuna etkisi [The effect of self-regulation based blended education on student motivation]. *Educational Technology Theory and Practice*, 1(1), 125-142.

Cabı, E. (2015). Öğretmen adaylarının öz-düzenleme stratejileri ve akademik başarısı: Boylamsal bir araştırma [The pre-service teachers' self-regulated strategies and academic success: A longitudinal study]. *Gazi Üniversitesi Gazi Eğitim Fakültesi Dergisi*, *35*(3), 489-506.

Camahalan, F. M. G. (2006). Effects of self-regulated learning on mathematics achievement of selected Southeast Asian children. *Journal of Instructional Psychology*, *33*(3), 194-205.

Can, A. (2014). *SPSS ile Bilimsel Araştırma Sürecinde Nicel Veri Analizi* [Quantitative data analysis with SPSS]. (4th edition). Ankara: Pegem Akademi.

Cheng, E. C. K. (2011). The role of self-regulated learning in enhancing learning performance. *The International Journal of Research and Review*, *6*(1), 1-16.

Clore, G. L., & Palmer, J. (2009). Affective guidance of intelligent agents: How emotion controls cognition. *Cognitive Systems Research*, *10*(1), 21-30.

Cohen, L., Manion, L. & Morrison, K. (2000). *Research methods in education* (5th edition). London, Routledge

Cornford, I. R. (2002). Learning-to-learn strategies as a basis for effective lifelong learning. *International Journal of Lifelong Education*, *21*(4), 357-368.

Coşkun, Y. D. (2018). *Yenilikçilik çağında düşünme: Neden eleştirel düşünmeliyiz? Eleştirel düşün [Thinking in an age of innovation: Why should we think critically? Think critically]*. (13-15). İstanbul: Yeditepe Üniversitesi.

Coşkun, Y. D. & Demirel, M. (2012). Üniversite öğrencilerinin yaşam boyu öğrenme eğilimleri [Lifelong learning tendencies of university students]. *Haccetepe Üniversitesi Eğitim Fakültesi Dergisi, 42*, 108-120.

Creswell, J. W. (2017). *Research Design: Qualitative, quantitative, and mixed methods approaches*. Thousand Oaks, CA: Sage Publications. USA.

Çatalbaş, A., Semerci, Ç. (2016). Hayat bilgisi dersi için hazırlanan öz düzenlemeli öğrenme modeli destekli etkinliklerin öğrencilerin öğrenme ve çalışma sorumluluğuna etkisi [Effect of Self-regulated Learning Model Based Activities prepared for Social Studies Lesson on Student Learning and Study Responsibilities]. *Abant İzzet Baysal Üniversitesi Eğitim Fakültesi Dergisi*, *16*(2), 399-412.

Çiltaş, A. (2011). Eğitimde öz-düzenleme öğretiminin önemi üzerine bir çalışma [A study on the importance of self-regulation teaching in education]. *Mehmet Akif Ersoy Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, *3*(5), 1-11.

de Boer, H., Donker-Bergstra, A. S., Kostons, D. D. N. M., Korpershoek, H., & Van der Werf, M. P. (2013). *Effective strategies for self-regulated learning: A meta-analysis*. Groningen, NL: GION/RUG.

De La Harpe, B., Radloff, A., & Wyber, J. (2000). Quality and generic (professional) skills. *Quality in Higher Education, 6*(3), 231-243.

Demir, M. K. (2006). *İlköğretim dördüncü ve beşinci sınıf öğrencilerinin sosyal bilgiler derslerinde eleştirel düşünme düzeylerinin çeşitli değişkenler açısından incelenmesi [The research of fourth and fifth grade primary school students critical thinking levels in social studies lessons according to different variables]* (Unpublished doctoral dissertation). Gazi University, Ankara.

Demiralp, D. (2016). *Öğretmen yetiştirme programlarının yaşam boyu öğrenme yetkinliğini kazandırmadaki etkililiğinin değerlendirilmesi [The sssessment of effectiveness of teacher training programs in upskilling lifeLong learning competence]* (Unpublished doctoral dissertation). Fırat University. Elazığ.

Demirel, Ö. (2017). *Eğitimde program geliştirme kuramdan uygulamaya [Curriculum development in education: from theory to practice]*. Ankara: Pegem Akademi.

Deveci, T., & Ayish, N. (2017). Correlation between critical thinking and lifelong learning skills of freshman students. *Bartın Üniversitesi Eğitim Fakültesi Dergisi, 6*(1), 282-303.

Dignath, C., Buettner, G., & Langfeldt, H. P. (2008). How can primary school students learn self-regulated learning strategies most effectively?: A meta-analysis on self-regulation training programmes. *Educational Research Review*, *3*(2), 101-129.

Diker Coşkun, Y. (2009). *Üniversite öğrencilerinin yaşam boyu öğrenme eğilimlerinin bazı değişkenler açısından incelenmesi [Investigation of life long learning tendency of undergraduate students' in terms of some variables]* (Unpublished doctoral dissertation). Hacettepe University, Ankara.

Dinsmore, D. L., Alexander, P. A., & Loughlin, S. M. (2008). Focusing the conceptual lens on metacognition, self-regulation, and self-regulated learning. *Educational Psychology Review*, *20*(4), 391-409.

Duman, B. (2018). Eğitimde çağdaş yaklaşımlar. [Contemporary approaches in education]. In G. Ocak (Ed.), *Öğretim ilke ve yöntemleri* (375-477). Ankara: Pegem Akademi.

Eker, C., & Arsal, Z. (2014). Öz düzenleme stratejileri öğretimi sürecinde ders günlükleri kullanmanın öz düzenleme stratejileri öğretimine etkisi [The impact of Teaching Diaries on the Use of Students' Self-Regulation Strategies]. *Karaelmas Eğitim Bilimleri Dergisi, 2*(1) 80-93.

Erdamar, G. (2017). Yaşam boyu öğrenme. [Lifelong learning]. In Ö.Demirel (Ed), *Eğitimde yeni yönelimler*. (s. 219-237). Ankara: Pegem Akademi.

Ertaş-Kılıç, H, & Şen, A. İ. (2014). UF/EMI Eleştirel Düşünme Eğilimi Ölçeğini Türkçeye Uyarlama Çalışması. [Turkish adaptation study of UF/EMI Critical Thinking Disposition Instrument]. *Eğitim ve Bilim, 39* (176), 1-12.doi: 10.15390/EB.2014.3632.

Facione, P. A. (1990). *Critical Thinking: A Statement Of Expert Consensus For Purposes Of Educational Assessment And İnstruction - Executive Summary - The Delphi Report.* Millbrae, CA: The California Academic Pres. ERIC Document Reproduction Service No. ED 315 423. Retrieved from http://ericir.syr.edu.

Fleming, V. M. (2002). Improving students' exam performance by introducing study strategies and goal setting. *Teaching of Psychology*, *29*(2), 115-119.

Fraenkel, J., Wallen, N., & Hyun, H. (2012). *How to Design and Evaluate Research in Education (8th Ed)*. New York: McGraw-Hill.

Garett, K., & Wulf, K. (1978). The relationship of a measure of critical thinking ability to personality variables and to indicators of academic achievement. *Educational and Psychological Measurement, 38*(4), 1181-1187.

Gurcay, D., & Ferah, H. O. (2018). High School Students' Critical Thinking Related to Their Metacognitive Self-Regulation and Physics Self-Efficacy Beliefs. *Journal of Education and Training Studies, 6*(4), 125-130.

Güneş, F. (2012). Öğrencilerin düşünme becerilerini geliştirme [Improving the Thinking Skills of Students]. *Türklük Bilimi Araştırmaları, (32),* 127-146.

Günüç, S., Odabaşı, H. F., & Kuzu, A. (2012). Yaşam Boyu Öğrenmeyi Etkileyen Faktörler [Factors affecting lifelong learning]. *Gaziantep University Journal of Social Sciences, 11*(2), 309-325.

Gür Erdoğan, D., & Arsal, Z. (2016). The development of lifelong learning trends scale (LLLTS). *Sakarya University Journal of Education, 6*(1), 114-122.

Güvenç, H. (2010). İşbirlikli öğrenme ve ders günlüklerinin öğretmen adayı öğrencilerin öz düzenlemeli ögrenmeleri üzerindeki etkileri [The effects of cooperative learning and learning journals on teacher candidates' self-regulated learning]. *Educational Sciences: Theory & Practice, 10*(3), 1459-1487.

Güvenç, H. (2011). Çalışma günlüklerinin 6.sınıf öğrencilerinin öz düzenlemeli öğrenmeleri üzerindeki etkileri [Effects of study diaries on sixth grades self regulated learnings]. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi, 41*, 206-213

Haşlaman, T., & Aşkar, P. (2007). Programlama dersi ile ilgili özdüzenleyici öğrenme stratejileri ve başarı arasındaki ilişkinin incelenmesi [Investigating the relationship between selg regulated learning strategies and achievement in a programming course]. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi, 32*(32), 110-122.

Hattie, J., Briggs, J., & Purdie, N. (1996). Eftects of learning skills interventions on student learning: A meta-analysis. *Review of Educational Research, 66*, 99-130.

Hoskins, B., & Fredriksson, U., (2008). *Learning to learn: What is it and can it be measured?*. Luxembourg: European Communities.

Ip, W. Y., Lee, D. T., Lee, I. F., Chau, J. P., Wootton, Y. S., & Chang, A. M. (2000). Disposition towards critical thinking: a study of Chinese undergraduate nursing students. *Journal of Advanced Nursing, 32*(1), 84-90.

Kang, Y. (2010). *Self-regulatory training for helping students with special needs to learn mathematics* (Doctoral dissertation).University of Iowa, Iowa City, IA. Retrieved on April 19, 2016 from Iowa Research Online: http://ir.uiowa.edu/etd/688

Kayıran, B. K. (2014). *Öz-düzenleyici öğrenmenin okuduğunu anlamaya yönelik akademik başarı, öz-düzenleme becerileri ve okuma stratejileri üzerindeki etkisi [The effects of self regulated learning on the academic achievemen of reading comprehension, self regulatory skills and reading strategies]* (Unpublished doctoral dissertation).Çukurova University, Adana.

Kimber, Ch. T. (2009). *The Effect of Training in Self-regulated Learning on Math Anxiety and Achievement Among Preservice Elementary Teachers in a Freshman Course in Mathematics Concepts.* Temple University. CITE/Mathematics and Science Education. En línea:

Klug, J., Krause, N., Schober, B., Finsterwald, M., & Spiel, C. (2014). How do teachers promote their students' lifelong learning in class? Development and first application of the LLL Interview. *Teaching and Teacher Education, 37*, 119-129.

Kou, Y. C. (2010). *Interaction, internet self-efficacy, and self-regulated learning as predictors of student satisfaction in distance education courses*. (Unpublished doctoral dissertation). Utah State University.

Kreber, C. (1998). The relationships between self-directed learning, critical thinking, and psychological type, and some implications for teaching in higher education. *Studies in Higher Education, 23*(1), 71-86.

Kuiper, R. (2002). Enhancing metacognition through the reflective use of self-regulated learning strategies. *The Journal of Continuing Education in Nursing, 33*(2), 78-87.

Kuyumcu Vardar, A. (2011). *Öz-düzenleme stratejileri öğretiminin öğrencilerin İngilizce başarılarına, öz-düzenleme stratejileri kullanımına ve tutumlarına etkisi [The effect of self-regulated learning strategies ınstruction on students' english achievement and attitude]* (Unpublished doctoral dissertation).Abant İzzet Baysal University, Bolu.

Lai, E. R. (2011). Critical thinking: A literature review. *Pearson's Research Reports, 6*, 40-41.

Lamar, S., & Lodge, J. (2014). Making sense of how I learn: Metacognitive capital and the first year university student. *The International Journal of the First Year in Higher Education, 5*(1), 93-105.

Lee, I. (2009). Ten mismatches between teachers beliefs and written feedback practice. *ELT Journal, 63*(1), 13-22.

Lemke, J., Coughlin, E., Thadani, V., & Martin, C. (2003). enGauge 21st century skills: Literacy in the digital age. Retrieved from http://pict.sdsu.edu/engauge21st.pdf

Miles, M. B. & Huberman, A. M. (1994). *Qualitative data analysis*. USA: SAGE Publications.

Ng, B. (2016). Towards Lifelong Learning: Identifying Learner Profiles on Procrastination and Self-Regulation. *New Waves-Educational Research and Development Journal, 19*(1), 41-54.

Nicols, D. (2009). Assessment for learner self-regulation: enhancing achievement in the first year using learning technologies. *Assessment and Evaluation in Higher Education, 34*(3), 335-352.

Öz, E., & Şen, H. S. (2018). Self Regulated Learning Questionnaire: Reliability and Validity Study. *Educational Policy Analysis and Strategic Research, 13*(4), 108-123.

Pape, S., & Wang, C. (2003). Middle school children's strategic behavior: Classification and relation to academic achievement and mathematical problem solving. *Instructional Science, 31*(6), 419-449.

Paris, S. G., & Winograd, P. (1990). Promoting metacognition and motivation of exceptional children. *Remedial and Special Education, 11*(6), 7-15.

Patton, M. Q. (2002). *Qualitative research and evaluation methods.* Thousand Oaks, California: Sage Publications.

Phan, H. P. (2006). Examination of student learning approaches, reflective thinking, and epistemological beliefs: A latent variables approach. *Electronic Journal of Research in Educational Psychology, 10*(4), 577- 610.

Phan, H. P. (2009). Relations between goals, self-efficacy, critical thinking and deep processing strategies: a path analysis. *Educational Psychology*, *29*(7), 777-799.

Phan, H. P. (2010). Critical thinking as a self-regulatory process component in teaching and learning. *Psicothema*, *22*(2), 284-292.

Saks, K., & Leijen, Ä. (2014). Distinguishing self-directed and self-regulated learning and measuring them in the e-learning context. *Procedia-Social and Behavioral Sciences*, *112*, 190-198.

Schraw, G., Crippen, K. J., & Hartley, K. (2006). Promoting self-regulation in science education: Metacognition as part of a broader perspective on learning. *Research in Science Education*, *36*(1-2), 111-139.

Schunk, D. H. (2009). *Eğitimsel Bir Bakışla Öğrenme Teorileri*. (Çev.Ed.: M. Şahin) Ankara: Nobel.

Schunk, D. H., & Zimmerman, B. J. (1994). *Self-regulation of learning and performance: Issues and educational applications*. Lawrence Erlbaum Associates, Inc.

Şahin, M., Akbaşlı, S. & Yanpar Yelken, T. (2010). Key competences for lifelong learning: The case of prospective teachers. *Educational Research and Review, 5*(10), 545-556.

Tanrıseven, I., & Dilmaç, B. (2013). Orta öğretim öğrencilerinin insani değerleri, motivasyonel inançları ve öz-düzenleme stratejileri arasındaki yordayıcı ilişkiler [Predictive relationships between secondary school students' human values, motivational beliefs, and self-regulated learning strategies]. *Kuram ve Uygulamada Eğitim Bilimleri*, *13*(1), 21-36.

Turan, S., & Demirel, Ö. (2010). Öz-düzenleyici öğrenme becerilerinin akademik başarı ile ilişkisi: Hacettepe üniversitesi tıp fakültesi örneği [The relationshıp between selfregulated learning skills and achievement: A case from Hacettepe University medical school]. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi 38*(38), 279-291.

Uzunboylu, H., & Hürsen, Ç. (2011). Lifelong Learning Competence Scale (LLLCS): The Study of Validity and Reliability. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi*, *41*, 449-460.

van Grinsven, L., & Tillema, H. (2006). Learning opportunities to support student self-regulation: Comparing different instructional formats. *Educational Research*, *48*(1), 77-91.

Yağlı, Ü. (2014). İngilizce dersinde öğrenmede kullanılan öz-düzenleme stratejileri ve başarı ile ilişkisi [The self-regulatory strategies and motivation used in learning english and its relation to achievement]. *Karaelmas Eğitim Bilimleri Dergisi, 2*(1), 108-116.

Yetkin Özdemir, İ. E., & Pape, S. J. (2012). Supporting students' strategic competence: a case of a sixth-grade mathematics classroom. *Mathematics Education Research Journal*, *24*(2), 153-168.

Yetkin, İ. E. (2006).*The role of classroom context in student self-regulated learning: an exploratory case study in a sixth-grade mathematics classroom* (Unpublished doctoral dissertation). UMI Number: 3217420, Ohio State University.

Yıldırım, A. & Şimşek, H. (2013). *Sosyal bilimlerde nitel araştırma yöntemleri [Qualitative research methods in the social sciences]*. Ankara: Seçkin Yayıncılık.

Yıldızlı, H. (2015). *Öz düzenlemeli öğrenmenin altıncı sınıf öğrencilerinin matematik başarılarına, tutumlarına ve öz düzenleme becerilerine etkisi [The effect of self-regulated learning on the sixth grade students' mathematics achievements, attitudes and self regulated skills]* (Unpublished doctoral dissertation). Necmettin Erbakan University, Konya.

Yilmaz, E., & Kaygin, H. (2018). The relation between lifelong learning tendency and achievement motivation. *Journal of Education and Training Studies*, *6*(3a), 1-7.

Zheng, L., Li, X., & Chen, F. (2018). Effects of a mobile self-regulated learning approach on students' learning achievements and self-regulated learning skills. *Innovations in Education and Teaching International*, *55*(6), 616-624.

Zimmerman, B. J. (1989). A social cognitive view of self-regulated academic learning.*Journal of Educational Psychology*, *81*(3), 329-339.

Zimmerman, B. J. (2002). Becoming a self-regulated learner: An overview. *Theory into Practice*, *41*(2), 64-70.

Zimmerman, B. J., & Martinez-Pons, M. (1986). Development of a structured interview for assessing student use of self-regulated learning strategies. *American Educational Research Journal*, *23*(4), 614–628.