Examining self-regulation skills of elementary school students

Oktay Kizkapan*, Faculty of Education, Nevsehir Haci Bektas Veli University, Nevsehir 50300, Turkey
Oktay Bektas, Faculty of Education, Erciyes University, Kayseri 38030, Turkey
Asli Saylan Kirmizigul, Faculty of Education, Erciyes University, Kayseri 38030, Turkey

Abstract

The purpose of this study is to determine elementary school students' level of self-regulation skills—goal setting and to develop strategies to achieve these goals. Survey method is used in the study with the participants of 368 students. The study was conducted at two elementary schools in Incesu and Kocasinan provinces of Kayseri and students filled a five-item Likert type scale. Data were analysed using statistical analysis program and 0.05 significance level was accepted. The result shows that the average grade of girls was higher than the boys, the average of 5th grades was higher than 6th grades and the average of the school in the city centre was higher than the school in the rural area. Also, there was a significant difference between the self-regulation scores of the grade levels in the favour of 5th grades. Lastly, the self-regulation score of the students living in city centre was higher than that of students living in village.

Keywords: Self-regulation, elementary education, survey research, elementary students.

---

* ADDRESS FOR CORRESPONDENCE: **Oktay Kizkapan,** Education Faculty, Nevsehir Hacı Bektas Veli University, Nevsehir 50300, Turkey. *E-mail address*: okizkapan@nevsehir.edu.tr / Tel.: 0-38-422-810-002-1095.

1. Introduction

The view that education is restricted to a certain period of time lost its validity by the help of the faster communication tools, increase in the average life span, economic and social changes and need for new knowledge and skills. Today, education is accepted as a process from birth to death. As a result of this, 'Life Long Learning' became a widening term all over the world. Expansion and acceptance of this term resulted in new approaches and theories for education. Today, learner is not just a person to whom knowledge is transformed but she/he is accepted as an individual, who can actively participate in the learning processes, who is responsible for his/her own learning, decides what to learn knows where and how to find required knowledge and construct that knowledge. Therefore, todays' education theories and approaches should be constructed to be able to achieve these requirements (Chee, 1997; Rowlands & Carson, 2001).

Constructivist approach converted the students from being passive listeners of teachers into an individual who can take the responsibility of his/her own learning and join actively into learning processes. Joining of the students into learning processes brought together the term self-regulation (Acikgoz, 2003).

Self-regulation strategies, one of the fundamental principles of social cognitive theory, are seen as a constructivist process in which students set goals for their learning and regulate their own cognition and behaviours (Pintrich, 2005). According to Risemberg and Zimmerman (1992), self-regulation is defined as setting goals, developing strategies to achieve these goals and monitoring the gains of these strategies. Zimmerman expresses not only the skills of individuals to perform their own behaviours against the environmental conditions but also obligation of acquiring necessary knowledge to use these skills under appropriate conditions. According to him, self-regulation is about the actions, thoughts and emotions to reach individual goals (Zimmerman, 2002).

Properties of students using self-regulation strategies are defined in different researches (Boekaerts, 1998; Derry & Murphy, 1986; Eker, 2012; Kremer & Tillema, 1999; Schunk, 2009; Zimmerman, 2002) as follows:

Students who use self-regulation strategies;

• set goals for their own learning and know how to choose and use strategies to achieve these goals, and use their sources effectively to get an efficient learning environment,
• set goals, adopt these goals and keep positive feelings toward their duties,
• are self-aware and control their learning,
• feel confident about learning skills and urge themselves to learn new knowledge and skills,
• have high self-efficacy and regulate their motivational believes according to needs,
• use environmental sources effectively to increase their academic achievements.

1.1. Purpose and significance of the study

It is important for students to observe their learning and determine whether they understand the lessons or not (Zimmerman, 2002). Since, in recent years, studies related to learning spread out to a wide variety of fields and focused on what people do rather than what they are, interest for the term 'self-regulation' has increased (Baumeister, Heatherton & Tice, 1993). There is a mass of studies related to self-regulation conducted in abroad (Hrbackova & Vavrova, 2015; Jdaitawi, 2015; Paris & Paris, 2001). Most of these studies are conducted in East and North America (Pintrich, 2005). In Turkey, it is seen that the number of studies related to self-regulation has been increasing. The importance of these issues is noticed by the effect of constructivist learning approach adopted by virtue of new reforms in education (Aydin, 2012).

In Turkey, it is seen that there is a significant increase in the number of studies related self-regulation strategies (Eker, 2012). Most of these studies are experimental studies, which searched for the effects of

self-regulation strategies (Gok, 2014; Grinsven & Tillema, 2006; Karabacak, 2014). However, the number of survey researches in this field is inadequate (Kalelioglu & Baturay, 2014; Karabacak, 2014). Survey research is important since it will reveal the level of students' self-regulation skills which is an important factor affecting students' academic achievements. Also, it is seen that most of the studies were conducted with prospective teachers and university students (Dogan, 2015). Therefore, in this study, it is aimed to measure the elementary students' (5th, 6th, 7th and 8th grade) level of self-regulation skills.

1.2. Research question

Research question of the study is determined as 'What is the level of self-regulation skills of elementary school students in İncesu and Kocasinan provinces of Kayseri?'. Sub-problems and hypothesis were presented below.

- Is there a significant difference between the average points of girls and boys?
- Is there a significant difference among the average points of grade levels?
- Is there a significant difference between the average points of the schools at which the study was conducted?
- H_0: There is no significant difference between self-regulation skills of girls and boys.
- H_0: There is no significant difference among the self-regulation skills of grade levels
- H_0: There is no significant difference between the self-regulation skills of the schools.

2. Method

In this part, information about the research design, population and sample of the study, data collection instrument and data collection process is presented. Reliability and validity studies were also presented in this part.

2.1. Research design

Survey research design, which is one of the quantitative research methods, was used to test the level of self-regulation skills of 5th, 6th, 7th and 8th grade students in Incesu and Kocasinan provinces of Kayseri. According to Buyukozturk, Cakmak, Akgun, Karadeniz and Demirel (2010) survey research aims to describe a situation that occurred in the past or at the present as it is. In this study, since the self-regulation skills of elementary students are searched, researchers decided to use survey research method.

2.2. Population and sample

In this study, target population was the whole elementary school students in Kayseri and accessible population was the elementary school students in Incesu and Kocasinan provinces. Generalisation was done to accessible population. In order to make the generalisation, 10% of the accessible population was reached. Sample was chosen according to convenience sampling approach. 84 fifth, 120 sixth, 103 seventh and 59 eighth grade students participated in the study; 177 of the participants were male and 191 of them were female.

2.3. Data collection instruments

In this research, the self-regulation tool developed by Pintrich, Smith, Garcia & McKeachie (1991) and called as 'Motivated Strategies for Learning Questionnaire' (MSLQ) was used. It is a Likert-type scale with three sections and 81 items in total. The items in 'cognitive and metacognitive strategies' section of the scale were used in this research. There are five categories in this section which are rehearsal, elaboration, organisation, critical thinking and metacognitive self-regulation.

Before using the tool, it was examined by two experts in science education for content validity. After experts' feedbacks, 1, 4, 8, 10, 12, 16, 17 and 18 items were revised, corrected and used in the scale. Also, while original scale was 7-level, after experts review, it was converted to 5-level scale. After that, the scale was applied to 416 students. Before statistical analysis, some students were omitted from data due to inconsistencies in their answers. Then; reliability, difficulty index, discrimination index and factor analysis were conducted through answers of 386 students.

Difficulty and discrimination indexes of items are calculated with both mathematical formulas and *t*-test analysis. While applying *t*-test, the answers of students who marked 4 and 5 in scale are accepted as correct. Then, upper and lower (27%) groups were formed and groups were compared for each question. Since the differences observed in desired way are significant, in other words, upper group performed better than lower group, and it is thought that internal consistency of the test is high and items in the scale are distinguishing.

Except item 17, there is a significant difference between groups. That is, the success of upper group is significantly higher than lower group for all items other than item 17. Therefore, it can be said that the mean of upper group is higher than that of lower group and the items are distinguishing. After *t*-test analysis, difficulty and discrimination indexes are calculated with formula. After calculations, item 17 was removed from the scale due to low item difficulty and discrimination indexes.

Factor analysis was conducted to test the construct validity. KMO value of the scale was calculated as 0.943 and it was seen that the items formed six factors but these factors couldn't be named. Therefore, factor analysis was conducted by limiting the number of factors first to five and then to four. Item 16 didn't enter into any of the factors. Therefore, this item was also removed from the scale. Then, when the factor analysis was conducted, KMO value was calculated as 0.945 and it was seen that the value was adequate to continue to factor analysis. When the components matrix was examined, it was seen that items are gathered under five factors and these factors cover the 51% of total variance.

Table 1. KMO and Bartlett's test scores of MSLQ

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.945
Bartlett's Test of Sphericity	Approx. Chi-Square	3915.451
	Df	406
	Sig.	0.000

KMO value supports the hypothesis that sample size and the collected data are appropriate and enough for the analysis and Bartlett's test score supports the hypothesis that data show multiple variables and normal distribution (Otrar, Gulten & Ozkan, 2012). Tables for total variance explained (Table 2) and rotated components matrix (Table 3) are presented in below.

Table 2. MSLQ total variance explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Var.	Cum.%	Total	% of Var.	Cum. %	Total	% of Var.	Cum.%
1	10.0	34.60	34.60	10.0	34.6	34.60	3.79	13.09	13.09
2	1.52	5.27	39.87	1.52	5.27	39.87	3.40	11.742	24.83
3	1.16	4.02	43.90	1.16	4.02	43.90	3.19	11.024	35.85
4	1.10	3.79	47.70	1.10	3.79	47.70	2.38	8.205	44.06
5	1.01	3.51	51.21	1.01	3.51	51.21	2.07	7.149	51.21
6	0.975	3.36	54.57						
7	0.921	3.17	57.75						
8	0.869	2.99	60.74						
9	0.835	2.87	63.62						
10	0.817	2.81	66.44						
11	0.760	2.62	69.06						

12	0.729	2.51	71.57
13	0.669	2.30	73.88
14	0.628	2.16	76.05
15	0.624	2.15	78.20
16	0.618	2.13	80.33
17	0.568	1.95	82.29
18	0.554	1.91	84.20
19	0.522	1.79	86.00
20	0.492	1.69	87.69
21	0.480	1.65	89.35
22	0.459	1.58	90.93
23	0.447	1.54	92.47
24	0.430	1.48	93.95
25	0.389	1.34	95.30
26	0.377	1.30	96.60
27	0.356	1.22	97.82
28	0.323	1.11	98.94
29	0.307	1.05	100.00

Table 3. Rotated component matrix for MSLQ

	Component				
	1	2	3	4	5
Item30	0.705				
Item28	0.648				
Item23	0.627				
Item12	0.492				
Item21	0.490				
Item25	0.462				
Item19	0.394				
Item10		0.682			
Item26		0.614			
Item14		0.554			
Item20		0.527			
Item29		0.481			
Item1		0.461			
Item22		0.382			
Item2			0.635		
Item7			0.630		
Item6			0.596		
Item5			0.556		
Item9			0.554		
Item4			0.432		
Item15			0.357		
Item24				0.691	
Item27				0.637	
Item11				0.627	
Item18				0.487	
Item8					0.744
Item3					0.731
Item31					0.440
Item13					0.380

It is seen from Table 3 that items are gathered under five factors, which have an eigenvalue greater than one and these items have acceptable factor loads (Min = 0.357 and Max = 0.744). There is no item under more than one factor. As a more important result, these items show similarities with theoretical structure. The items which gathered under sub-dimensions and the number of items are shown below.

Table 4. Items and sub-dimensions of the scale

Factor	Number of items	Items
Metacognitive Self-regulation	7	12, 19, 21, 23, 25, 28, 30
Critical Thinking	7	1, 10, 14, 20, 22, 26, 29
Elaboration	7	2, 4, 5, 6, 7, 9, 15
Organisation	4	11, 18, 24, 27
Arrangement	4	3, 8, 13, 31

As it can be seen from Table 4, first, second and third factors are composed of seven items while fourth and fifth factors are composed of four items. The scale, as its last version, is composed of 29 items and it consists of five dimensions, which are meta-cognitive self-regulation, critical thinking, elaboration, organisation and arrangement.

After controlling the validity of the scale, reliability was checked. Cronbach's alpha reliability coefficient was calculated. Cronbach's alpha coefficient of the scale was calculated as 0.928. Cronbach's alpha value is a measure for the internal consistency of the scale and values 0.70 and above is acceptable (Buyukozturk, 2011; Fraenkel & Wallen, 1996). Therefore, the scale was accepted as reliable. Then, the reliability analysis of each factor was calculated and results were reported. As it can be seen from Table 5, reliabilities of the factors are acceptable or close (for four and five factors).

Table 5. Reliability of the factors

Factors	Items	Cronbach's Alfa Reliability
Metacognitive Self-Regulation	12, 19, 21, 23, 25, 28, 30	0.827
Critical Thinking	1, 10, 14, 20, 22, 26, 29	0.793
Elaboration	2, 4, 5, 6, 7, 9, 15	0.786
Organisation	11, 18, 24, 27	0.699
Arrangement	3, 8, 13, 31	0.670

2.4. Data collection process

The study aiming to search the level of self-regulation skills of elementary school students is conducted in the following order:

• By searching the literature, national and international studies are examined by researcher.
• A literature review was conducted to decide on the scale to be used in the study.
• Scale was examined by two experts in science education and corrected based on their feedback.
• The scale was conducted in two high schools in Incesu and Kocasinan provinces of Kayseri by researcher.
• Obtained data were analysed and results were reported.

2.5. Data analysis

Data of the study were analysed by using a statistic package program. *T*-test was used to test the effect of gender and school on self-regulation skills; one-way ANOVA was used to compare the self-regulation skills of 5th, 6th, 7th and 8th grade students.

3. Findings

In this section, the findings of the study were presented. For each sub-problem, before inferential statistics, the necessary assumptions for each analysis were met and the results are presented.

3.1. Findings of first sub-problem

Self-regulation skills of girls and boys were compared in the first sub-problem. The results of descriptive statistics belong to data of girls and boys were shown below. Table 6 shows the results of the first sub-problem.

Table 6. Results of descriptive statistics belong to scores of girls and boys

	Gender		Statistic	Std. Error
Total	Boys	Mean	114.11	1.53
		Median	116.00	
		Skewness	−0.406	0.183
		Kurtosis	0.015	0.363
	Girls	Mean	121.72	1.121
		Median	125.00	
		Skewness	−0.539	0.176
		Kurtosis	−0.433	0.350

As it can be seen from Table 6, the mean (114.1) and median (116.0) of self-regulation scores of boys are close to each other. Similarly, mean (121.72) and median (125.0) of self-regulation scores of girls are close to each other. Also, skewness and kurtosis values are between +1 and −1 for both groups. Hence, since skewness and kurtosis values are between desired interval and mean and median values are close to each other, it is thought that self-regulation scores of boys and girls show normal distribution (Clements, 1999).

As a result, since self-regulation scores of boys and girls show normal distribution, *t*-test was decided to be used in analysing of first sub-problem. *t*-test results were given to test whether there is a difference between self-regulation scores of boys and girls.

Table 7. Independent sample *t*-test results of self-regulation scores of boys and girls

	Levene's Test for Equality of Variances		*t*-test for Equality of Means		
	F	Sig.	t	df	Sig. (2-tailed)
l Equal variances assumed	11,49	,001	−4,05	366	,000
Equal variances not assumed			−4,009	327,96	,000

As it can be seen from Table 7, there is a significant difference between the self-regulation scores of boys and girls ($p < 0.05$). This difference is in the favour of girls. That is, girls have more developed self-regulation skills than boys. Hence, hypothesis one was rejected.

3.2. Findings of second sub-problem

In the second sub-problem of the study, self-regulations of 5th, 6th, 7th and 8th grade students are compared. For this sub-problem, since there is one independent variable with four dimensions, one-way ANOVA was used in statistical analyses. Assumptions for this analysis are met and equality of variances is controlled and results are shown below.

Table 8. Results of descriptive statistics belong to scores of grade levels

	Grade		Statistic	Std. Error
Total	5	Mean	122.25	2.03
		Median	123.42	
		Skewness	−0.380	0.263
		Kurtosis	−0.588	0.520
	6	Mean	115.22	1.57
		Median	114.50	
		Skewness	−0.537	0.219
		Kurtosis	0.735	0.435
	7	Mean	119.05	1.79
		Median	123.00	
		Skewness	−0.892	0.238
		Kurtosis	0.662	0.472
	8	Mean	116.22	2.54
		Median	119.00	
		Skewness	−0.729	0.311
		Kurtosis	−0.117	0.613

As it can be seen from Table 8, the mean and median of the scores of each grade level are close to each other. Also, for each grade level, skewness and kurtosis values of the scores are between +1 and −1. Hence, since skewness and kurtosis values are between desired interval and mean and median values are close to each other, it is thought that self-regulation scores of grade levels show normal distribution (Clements, 1999). Being the second assumption of the ANOVA, the equality of variances was tested and results were shown.

Table 9. Results of equality of variances analysis

Levene Statistic	df1	df2	Sig.
0.762	3	364	0.516

According to Levene's statistics results, it can be said that equality of variances was not violated (p >0.05). As a result, one-way ANOVA was decided to be used in the analysis of the second sub-problem. ANOVA results were given to test whether there is a difference between self-regulation scores of 5th, 6th, 7th and 8th graders.

Table 10. ANOVA results of self-regulation scores of 5th, 6th, 7th and 8th grade students

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	2761.05	3	920.35	2.76	0.042
Within Groups	121302.39	364	333.24		
Total	124063.45	367			

As it can be seen from Table 10, there is a significant difference between grade levels in self-regulation scores (p <0.05). Therefore, hypothesis 2 was rejected. In order to determine the direction of the difference, post-hoc analysis was conducted and the results were presented below.

Table 11. Post-hoc scores of ANOVA

	(I) class	(J) class	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	5	6	7.031[*]	2.58	0.035	0.35	13.71
		7	3.193	2.68	0.634	−3.73	10.11
		8	6.02	3.10	0.212	−1.97	14.03
	6	5	−7.03[*]	2.58	0.035	−13.71	−0.35

7	−3.83	2.44	0.396	−10.14	2.46
8	−1.00	2.89	0.986	−8.47	6.46

When the Tukey results were examined, it is seen that there is a difference only between 5th and 6th graders. This difference is in the favour of 5th graders. There is no significant difference between the self-regulation scores of other grade levels.

3.3. Findings of third sub-problem

In the third sub-problem of the research, self-regulation scores of two schools at which the research was conducted are compared. For this sub-problem, school is independent variable and self-regulation score is the dependent variable. Independent sample *t*-test was used since there are only two schools in the study. Results regarding the assumptions and *t*-test analysis were given below.

Table 12. Descriptive statistics belong to self-regulation scores of the schools

	School		Statistic	Std. Error
Total	School-A	Mean	112.22	1.77
		Median	113.78	
		Skewness	−0.588	0.22
		Kurtosis	0.492	0.44
	School-B	Mean	120.85	1.09
		Median	123.04	
		Skewness	−0.531	0.154
		Kurtosis	−0.276	0.307

As it can be seen from Table 12, the mean (112.22) and median (113.78) of self-regulation scores of School-A are close to each other. In the same way, the mean (120.85) and median (123.04) of self-regulation scores of School-B are close to each other. Moreover, skewness and kurtosis values of the scores are between +1 and −1. Since mean and median of the scores are close to each other and skewness and kurtosis values are between desired intervals, it is thought that self-regulation scores show normal distribution for both groups (Clements, 1999).

As a result, since the scores of the students of school-A and School-B show normal distribution, a parametric test, independent samples *t*-test was used. *t*-test results belong to self-regulation scores of school-A and School-B were presented in Table 13.

Table 13. Independent samples *t*-test result of school scores

		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
total_1	Equal variances assumed	1.654	0.199	−4.30	366	0.000
	Equal variances not assumed			−4.13	210.04	0.000

It is seen from Table 13 that equality of variances is not violated ($p > 0.05$). So, the assumed value for sig.2 is used in analysis. According to this value (0.00), there is a significant difference between the self-regulation scores of school–A and School-B ($p < 0.05$). This difference is in the favour of School-B. Therefore, hypothesis 3 was rejected.

4. Result and discussion

In this section, the findings of the study are interpreted and discussed based on the differences and similarities with previous studies. According to findings of the study, it is found that self-regulation score of girls is higher than that of boys. When the self-regulation skills are examined based on gender, it is generally seen higher in the favour of girls (Raffaelli, Crockett & Shen, 2005; Zimmerman & Martinez-Poz, 1986). Zimmerman and Martinez-Poz (1986) have conducted interviews with 5th, 8th and 11th grade students to determine if the self-regulation skills are dependent to gender or not. At the end of the interviews, they reached to a conclusion that girls are better at goal setting, planning, record keeping and self-monitoring skills. Datli (2015) stated that girls' self-regulation skills in science and technology course are higher than the boys. In another study, Wigfield, Eccles and Pintrich (1996) expressed that the reason behind the difference between self-regulation skills of girls and boys may be the fact that girls and boys approach to the items in self-regulation scale with different cognitive schemes. Researcher noticed that girls behave more modest in their responses. On the other hand, Philips and Zimmerman (1990) drew attention to the effects of family, culture, education and communication tools as a reason of difference in self-regulation skills of girls and boys. On the contrary, Ilgaz (2011) found no significant difference between the self-regulation scores of boys and girls. In the current study, the reason behind the difference may be the cultural factors. Since boys grow in a complacent environment, in other words, girls grow more under control than boys, this may affect self-regulation skills of girls positively.

In the second sub-problem, based on the class level, it is seen that there is a significant difference between the self-regulation scores of the grade level in the favour of 5th graders. It is thought as a reason that 5th graders have just graduated from primary school and keep the self-regulation skills obtained in there. As another reason, self-regulation skills may be reduced in the following years because in primary school, students have only one teacher and they see him/her as a role model but in elementary schools, student have many teachers with different approaches. So, students experience a conflict between teachers and students' self-regulation skills decrease as a result of this conflict. Also, as the grade-level increases, students go through adolescence and gain their independence and lose their self-regulation skills in this process. Consequently, it can be concluded that students' self-regulation skills get lower and lower in years and their self-regulation scores decreases (Ilgaz, 2011; Kilic Cakmak, Akgun, Karadeniz, Buyukozturk & Demirel, 2008). As the reason behind this decrease, they stated that students enter into an exam-centred race and give up using self-regulation skills to adapt to the race. As a result of this, students internalise memory-centred approach rather than constructivist learning. On the other hand, some studies in the literature revealed that self-regulation skills of students increase along with the age (Zimmerman, 1990; Zimmerman & Martinez-Pos, 1986).

In the third sub-problem of the research, self-regulation scores of the schools at which the study was conducted were compared and it is found that self-regulation scores of the students studying at School-B is higher than that of students studying at School-A. The reason of this result is thought that while School-B is located at city centre, school-A is a village school. Students at city centre have more advantages in terms of socio-economic status, environmental conditions and external help. This may be why students of School-B have higher scores than the students of School-A.

5. Recommendations

Based on the findings of the current study, the followings are recommended for researchers, teachers, policy makers and students:

Kizkapan, O., Bektas, O. & Saylan-Kimizigul, A. (2018). Examining self-regulation skills of elementary school students. *Cypriot Journal of Educational Science. 13*(4), 613-624.

1. Teachers should help students to set accessible goals for themselves not to decrease their self-regulation skills over years (Acikgoz, 2003).
2. According to Kitsantas and Zimmerman (2009), home works are effective in students' self-regulations and self-efficacies. Therefore, teachers can assign homeworks and project works for students, especially at 7th and 8th grades.
3. Course books should be prepared in a way that they should give opportunities for students to explore the knowledge.
4. Teachers should encourage students to take notes and keep diaries and notebooks.
5. In teacher education programs, activities that emphasise the importance of self-regulation can take place.

References

Acikgoz, K. U. (2003). *Etkili ogrenme ve ogretme*. Izmir, Turkey: Egitim Dunyasi Yayinlari.

Aydin, S. (2012). *Proje tabanli ogrenme ortamlarının biyoloji ogretmen adaylarinin oz duzenleme seviyeleri ve oz yeterlik inancları uzerine etkisi* (Unpublished Doctoral Dissertation), Ankara, Turkey: Gazi University, Graduate School of Educational Sciences.

Baumeister, R. F., Heatherton, T. F. & Tice, D. M. (1993). When ego threats lead to self-regulation failure: negative consequences of high self-esteem. *Journal of Personality and Social Psychology, 64*(1), 141–156.

Boekaerts, M. (1998). Do culturally rooted self-construals affect students' conceptualization of control over learning? *Educational Psychologist, 33*, 87–108.

Buyukozturk, S. (2011). *Sosyal bilimler icin veri analizi el kitabi*. Ankara, Turkey: Pegem Yayincilik.

Buyukozturk, S., Cakmak, E. K., Akgun, O. E., Karadeniz, S. & Demirel, F. (2010). *Bilimsel arastırma yontemleri*. Ankara, Turkey: Pegem Yayincilik.

Chee, Y. S. (1997). Toward social constructivism: changing the culture of learning in schools. Kuching, Malaysia: *International Conference on Computers in Education* (pp. 81–88).

Clements, D. H. (1999). Geometric and spatial thinking in young children. In J. V. Copley (Ed.), *Mathematics in the early years* (pp. 66–79). Reston, VA: National Council of Teachers of Mathematics.

Datli, G. (2015). *Ortaokul 8. sinif ogrencilerinin fen ve teknoloji dersine yonelik oz duzenleme becerileri ve oz yeterlikleri ile akademik basarilari arasindaki iliskinin incelenmesi* (Unpublished Doctoral Dissertation). Kahramanmaras Sutcu Imam University, Graduate School of Social Sciences, Kahramanmaras.

Derry, S. J. & Murphy, D. A. (1986). Designing systems that train learning ability: from theory to practice. *Review of Educational Research, 56*(1), 1–39.

Eker, C. (2012). *Oz duzenleme surecinde gunluklerin egitici islevi* (Unpublished Doctoral Dissertation). Bolu, Turkey: Abant Izzet Baysal University, Graduate School of Educational Sciecnes.

Fraenkel, J. K. & Wallen, N. E. (1996). *How to design and evaluate research in education* (3rd ed.). NY, USA: McGraw-Hill, Inc.

Gok, G. (2014). *The effect of 7e learning cycle ınstructıon on 6th grade students' conceptual understanding of human body systems, self-regulation, scientific epistemological beliefs, and science process skills* (Unpublished Doctoral Dissertation). Ankara, Turkey: Middle East Technical University, Graduate School of Social Sciences.

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

Hrbackova, K. & Vavrova, S. (2015). Self-regulation in children and minors in institutional care. *International Education Studies, 8*(5).

Ilgaz, G. (2011). *Ilkogretim ogrencilerinin fen ve teknoloji dersi oz-duzenlemeli ogrenme stratejileri, oz-yeterlik ve ozerklik algilarinin incelenmesi* (Unpublished Doctoral Dissertation). Ankara, Turkey: Gazi University, Graduate School of Educational Sciences.

Jdaitawi, M. (2015). Social connectedness, academic, non-academic behaviors related to self-regulation among university students in Saudi Arabia. *International Education Studies, 8*(2), 84.

Kizkapan, O., Bektas, O. & Saylan-Kimizigul, A. (2018). Examining self-regulation skills of elementary school students. *Cypriot Journal of Educational Science. 13*(4), 613-624.

Kalelioglu, F. & Baturay, M. H. (2014). E-ogrenme icin hazirbulunusluk oz degerlendirme olceginin Turkce'ye uyarlanmasi: Gecerlik ve Guvenirlik Calismasi. *Baskent University Journal of Education, 1*(2), 22–30

Karabacak, U. (2014)*. Ozduzenleme ve ilkogretim ikinci kademe ogrencilerinin fen basarisinin incelenmesi* (Unpublished Master Thesis). Balikesir, Turkey: Balıkesir Universtiy, Graduate School of Positive Sciences.

Kilic Cakmak, E., Akgun, O. E., Karadeniz, S., Buyukozturk, S., & Demirel, F. (2008). Ilkogretim ikinci kademe ve lise ogrencilerinin ders ve sinif duzeylerine gore ogrenme stratejileri ve gudulenme duzeylerinin belirlenmesi. *Uluslararası Insan Bilimleri Dergisi*. Retrieved from:

http://www.j-humansciences.com/ojs/index.php/IJHS/article/viewFile/454/285 on 09.01.2016.

Kitsantas, A. & Zimmerman, B. J. (2009). College students' homework and academic achievement: The mediating role of self-regulatory beliefs. *Metacognition and Learning, 4*(2), 1556–1623.

Kremer, H. L. & Tillema, H. H. (1999). Self-regulated learning in the context of teacher education, *Teacher and Teacher Education, 15*(5), 507–522.

Otrar, M., A. E., Gulten, D. C. & Ozkan, E., (2012). Ilkogretim ogrencilerine yonelik ogrenme stilleri olcegi gelistirilmesi (Aos-I). *Egitim ve Ogretim Arastirmalari Dergisi, 1*(2). 305–318.

Paris, S. G. & Paris, A. H. (2001). Classroom applications of research on self-regulated learning. *Educational psychologist, 36*(2), 89–101.

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*, San Diego, CA: Academic Press.

Pintrich, P. R., Smith, D. A. F., Garcia, T. & McKeachie W. J. (1991). *A manual for the use of the motivated strategies for learning questionnaire (MSLQ)*. MI, USA: School of Educational Building. The University of Michigan.

Raffaelli, M., Crockett, L. J. & Shen, Y. (2005). Developmental stability and change in self-regulation from childhood to adolescence*. Journal of Genetic Psychology, 166*, 54–75.

Risemberg, R. & Zimmerman, B. J. (1992). Self-regulated learning in gifted students. *Roeper Review, 15*(2), 98–101

Rowlands, S. & Carson, R. (2001). Contradictions in the constructivist discourse. *Philosophy of Mathematics Education Journal, 14* (P. Ernest, Ed.). Retrieved from:

http://www.people.ex.ac.uk/PErnest/pome14/rowlands.pdf

Schunk, D. H. (2009). *Ogrenme teorileri, egitimsel bir bakisla* (cev. M. Sahin). Ankara, Turkey: Nobel Yayın Dagitim.

Wigfield, A., Eccles, J. S. & Pintrich, P. R. (1996). Development between the ages of 11 and 25. In D. C. Berliner & R. C. Calfee (Eds.), *Handbook of educational psychology* (pp. 148–185). NY, USA: Simon and Schuster Macmillan.

Zimmerman, B. J. (1990). Self-regulated learning and academic achievement: An overview. *Educational Psychologist, 25*, 3–17.

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

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