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The Effect of Activities Designed According to the Incremental Self-theory on Students' Self-confidence and Their Views About Their Growth Mindset in 7th Grade Science Lesson

Sema İrem Orhan[a*], Abdullah Aydın [b]

a* Dr., Kastamonu University, Turkey (https://orcid.org/0000-0002-4554-1439), * iorhan@kastamonu.edu.tr

b Prof. Dr., Faculty of Education, Kastamonu University, Turkey (https://orcid.org/0000-0003-2805-9314)

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ABSTRACT

The aim of this study was to determine the effect of the activities prepared in line with the incremental self-theory on 7th grade students' self-confidence and their views about their growth mindset in the cell and divisions unit in science. In accordance with this purpose, the research was conducted with 54 seventh grade students who are studying in two classes in a public secondary school in Kastamonu Province, Turkey. With simple random sampling, one of these classes was determined as the experimental group (N=27) and the other as the control group (N=27). While the lessons of the experimental group were taught with the activities developed in accordance with the incremental self-theory, the lessons of the control group were taught in compliance with the 2018 Science Course Curriculum. In this study, in which both quantitative and qualitative data were collected, a quasi-experimental design with a pre-test post-test control group was used. The quantitative data were collected through the Self-confidence Scale (SS), and the qualitative data were collected through the Feedback Forms (FF). SPSS package program was used in the analysis of quantitative data, and the descriptive analysis was used in the analysis of qualitative data. As a result of this study, it was determined that the instruction designed according to the incremental self-theory had a positive effect on the increase in the self-confidence of the students in the experimental group and their views on their growth mindset. In line with these results, it is suggested that science teachers should design and teach science subjects according to incremental self-theory.

Keywords: Growth mindset, self-confidence, incremental self-theory, science education

7. Sınıf Fen Bilimleri Dersinde Gelişim Öz-teorisine Göre Tasarlanan Etkinliklerin Öğrencilerin Özgüvenlerine ve Gelişime Açık Düşünce Tarzlarıyla İlgili Görüşlerine Etkisi

ÖZ

Bu araştırmanın amacı, 7. sınıf fen bilimleri dersi hücre ve bölünmeler ünitesine yönelik olarak gelişim öz-teorisi doğrultusunda hazırlanan etkinliklerin, öğrencilerin özgüvenlerine ve gelişime açık düşünce tarzı ile ilgili görüşlerine olan etkisini belirlemektir. Bu amaç doğrultusunda, Kastamonu İl merkezindeki bir devlet ortaokulunun iki şubesinde öğrenim gören 54 yedinci sınıf öğrencisi ile araştırma yapılmıştır. Basit rastgele örneklem seçimi ile bu şubelerden biri deney (N=27), diğeri ise kontrol grubu (N=27) olarak belirlenmiştir. Hücre ve bölünmeler ünitesi kontrol grubundaki öğrencilere 2018 Fen Bilimleri Dersi Öğretim Programı'na göre anlatılırken, deney grubundaki öğrencilere ise mevcut öğretim programına ilaveten gelişim öz-teorisi doğrultusunda hazırlanan etkinliklerle desteklenerek anlatılmıştır. Hem nicel hem de nitel verilerin toplandığı bu araştırmada, ön-test son-test kontrol gruplu yarı deneysel desen kullanılmıştır. Nicel veriler Özgüven Ölçeği (ÖÖ), nitel veriler ise Geri Dönüt Formları (GDF) aracılığı ile toplanmıştır. Nicel verilerin analizinde SPSS paket programı, nitel verilerin analizinde ise betimsel analiz kullanılmıştır. Araştırmanın sonucunda, gelişim öz-teorisine göre tasarlanan öğretimin deney grubunda bulunan öğrencilerin özgüvenlerinin artmasında ve onların gelişime açık düşünce tarzı ile ilgili görüşlerine olumlu yönde etki ettiği tespit edilmiştir. Bu sonuçlar doğrultusunda, fen bilimleri dersi öğretmenlerine fen konularını gelişim öz-teorisine göre tasarlayarak öğretmeleri önerilmektedir.

Anahtar kelimeler: Gelişime açık düşünce tarzı, özgüven, gelişim öz teorisi, fen eğitimi

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1 | INTRODUCTION

One of the concepts that has emerged together with humanity is belief. Humans have a tendency to develop behaviors in line with the beliefs they adopted. The mindsets, which have been structured parallel to the belief adopted, directly or indirectly affect behaviors (Dweck, 2006). Studies have shown that beliefs, behaviors and feelings of people in the social environment, as well as one's own beliefs, are also effective on the person (Christakis & Fowler, 2013). It is inevitable that the beliefs supported by the research results that have a great impact on our lives have reflections on educational life.

According to Dweck (2006) from the Psychology Department of Stanford University, who has become popular with her studies on the effect of the mindsets developed according to the adopted belief, especially motivation and achievement, the mindset is one of the most important elements that affect a person's character and potential, and people's way of thinking are defined under two intelligence mindsets as fixed mindset and growth mindset (Dweck, 2006; Dweck & Leggett, 1988). According to the growth mindset, intelligence is a characteristic that could be improved in time (Dweck, 2006; Keenan, 2018; Orosz et al., 2017). Contrary to this view, fixed mindset theory argues that intelligence and skills are innate characteristics, and thus they could not be improved (Dweck, 2006; Dweck & Leggett, 1988; Walters, 2014). Therefore, people who believe in the existentialism theory supporting the opinion that intelligence and skills are innate and cannot be improved are defined as people with fixed mindset while individuals who believe in the self-development theory supporting the idea that the skills and intelligence can be improved with effort are defined as people with growth mindset (Dweck, 2006; 2015).

Individuals with a growth mindset believe that their abilities can be developed with the right directed work and effort, so they are under the control of their own learning (Stec, 2015), and researches provide evidence that students with this style of thinking increase their learning and academic achievement and increase their self-efficacy (Keenan, 2018).

Another concept affecting human behavior is self-confidence. Self-confidence is defined as the belief of the individual that he or she could control the situation he/she is in or the events they encounter (Eldeleklioğlu, 2004), and the confidence in self to be achievement in this process (Akagündüz, 2006). Put it differently, the concept of self-confidence expresses the value judgement the individual attributed to himself or herself (Bandura, 1997). According to Dweck (2006), individuals with a mindset open to development do not get frustrated in face of a failure they experience, and they define these failures as a part of the learning process. Accordingly, individuals with a mindset open to development are expected to have high self-confidence levels.

Within the scope of the researches, it has been determined that students' mindset is related to their academic achievement, motivation and efforts towards learning, and ways of dealing with failure and difficulties (Aditomo, 2015; Blackwell, Trzesniewski & Dweck, 2007; Costa & Faria, 2018; Hong et al., 1999). So, it is extremely important to consider the growth mindset in the concept of education and to carry out researches aimed at obtaining the highest level of benefit within the means. In this context, it is necessary to include elements that improve growth mindset in the process of designing effective and efficient learning systems and appropriate learning environments in order to help students, teacher candidates and teachers to be individuals with a growth mindset.

When the national literature on this subjects was reviewed, no studies could be found on mindset in science education field. Three of the five thesis studies reached in this context are on psychology (Aral, 2019; Bilir, 2017; Yalın, 2014), and two are on grammar education (Altunel, 2019; Delibalta, 2020). The international literature, on the other hand, numerous studies were found on this very popular subject. In the studies in the international literature were in fields such as fine arts, personal training and mathematics training mostly, and they generally focused on the effects of mindset on achievement and motivation. Despite the scarcity of studies on self-confidence, Masters (2013) defined three basic approaches to evaluate learning outcomes and provide feedback. In his study, he found that the achievement and motivation of the students increased, as their efforts and struggles had been praised. In a similar fashion, Vealey, Chase and Cooley (2017) found that the mindsets of young sportspeople about the skills they had developed had a powerful impact on their self-confidence. In other studies, O'Brien & Lomas (2017), in their study investigating the effects of mindset developing activities in an open-air personal development course, found that there is no significant difference between the self-sufficiency scores of the experimental and the control group. However, they found a significant increase in the resistance (struggling

strength) in the students in the experimental group, whose growth mindset score increased. Seals (2018) found that online activities designed to support the growth mindset, and administered to teachers, affected the interest in the course, and their orientation for mastership. King (2020) in his study investigating the relationship between the mindsets of the students themselves and the mindset of their friends found that the mindsets interacted with each other between peers. Similarly, Sheffler and Cheung (2020), in their study observing the effects of peer mindsets on the learning outcomes of the students, concluded that peer mindset could affect the meaning an individual attribute to a task he or she assumed.

Although there are studies investigating self-confidence's relationship with age, gender, academic achievement, locus of control, test anxiety and body perception (Bilgin, 2001; Çakmak, Şahin & Akıncı-Demirbaş, 2017; Çankaya, 1997; Dorak, 2011), evaluating the efficiency of self-confidence development programs based on various approaches (Aksaray, 2003; Güloğlu, 1999; Sezer, 2001) and investigating the efficacy of a self-confidence development program based on bibliocounselling (Karacan-Özdemir, 2016), there is no study investigating the effects of activities designed in accordance with growth mindset on the students' self-confidence.

In this study, the 7th grade cell and divisions unit was selected. Because, when the literature is examined, it is seen that the subjects related to the cell and divisions unit and genetic unit are among the subjects that students frequently experience learning problems (DeHoff, 2010; El-Hani, 2014; Erdoğan, Özsevgeç & Özsevgeç, 2014; Vlckova, Kubiatko & Uşak, 2016). In addition, it was thought that this unit subjects were suitable for doing activities with the incremental self-theory.

THE AIM OF THE STUDY

The aim of this study was to determine the effect of the activities prepared in line with the incremental self-theory on 7th grade students' self-confidence and their views about their growth mindset in the cell and divisions unit in science lesson. The findings of the study are expected to contribute to the literature on growth mindset and self-confidence. Within the scope of this study, the following research questions were tried to be responded:

1. The activities designed according to the incremental self-theory used in the teaching of the 7th grade cell and divisions unit impact on students' self-confidence?
2. What are the students' views about their growth mindset?

2 | METHOD

RESEARCH DESIGN

The study was conducted with a mixed research approach, in which both the qualitative and quantitative approaches were used. The use of qualitative and quantitative data collection tools together in the mixed approach enables the researcher to eliminate the weak points of one approach with the strong points of the other, and this diversity enriches the study. Therefore, the results obtained could be interpreted more accurately (Creswell & Clark, 2007). In the study, a quasi-experimental design with a pre-test post-test control group was preferred among experimental research methods.

The questionnaire technique (self-confidence scale) was used within the framework of the quantitative dimension of the study, in which pre- and post-implementation self-confidence levels were examined. Within the scope of the qualitative dimension that examines the views of students about the growth mindset during the applied education, the feedback forms applied on a weekly basis were used. The pattern used in the research is given in Figure 1.

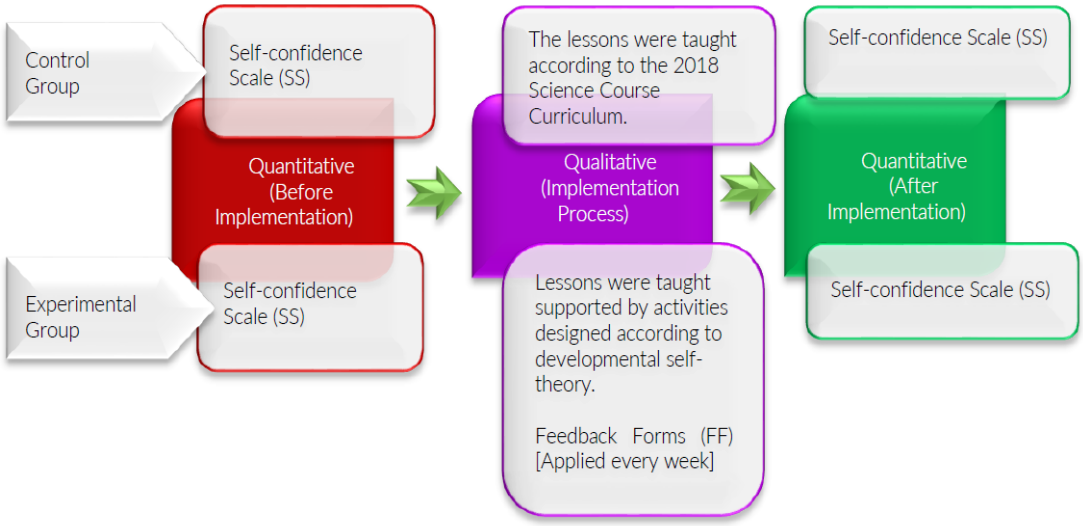

Figure 1. *Experimental Design Used in the Study*

STUDY GROUP

The study was conducted, after obtaining the approval of Kastamonu Provincial Directorate for National Education, with 54 seventh grade students who are studying in a public secondary school in Kastamonu Province, Turkey. The Self-confidence Scale, was used to determine whether the determined groups were equivalent to each other in terms of their self-confidence levels, and the results obtained are presented in Table 1.

Table 1. Self-confidence Scale Scores of Students in the Control and Experimental Groups

Group	N	Mean of Ranks	Sum of Ranks	U	*p*
Control	27	25.74	695.00	317.00	.411
Experimental	27	29.26	790.00		

As seen in Table 1, the students in both groups were close with regard to their self-confidence scale scores (U=317.00; p>.05). This indicates that the groups selected fit the aim of the study. The students in 7-E and 7-F classes, who were found to have close scores in the self-confidence scale, comprised the study group of the study. From these classes 7-E (N=27) were randomly determined as the control group and 7-F (N=27) as the experimental group. The demographic characteristics of the study group are given in Table 2.

Table 2. Demographic Characteristics of the Study Group

Group	Gender			
	Female		Male	
	N	%	N	%
Control	13	48.15	14	51.85
Experimental	14	51.85	13	48.15
Total	27	100	27	100

As seen in Table 2, 48.15% of the students in the control group were female, 51.85% were male, and in the experimental group, 51.85% were female and 48.15% were male.

DATA COLLECTION TOOLS

Quantitative data was collected using the self-confidence scale, and the qualitative data was collected with the feedback forms administered every week.

SELF-CONFIDENCE SCALE (SS)

The Self-confidence scale, developed by Akın (2007), is comprised of 33 five-point Likert type (1=Never, 2=Rarely, 3=Sometimes, 4=Often, 5=Always) items 17 of which are related to internal confidence and 16 related

to external confidence. A minimum of 33 and a maximum of 165 points can be optained from the SS. However, in order to interpret these obtained scores more easily, the data obtained from the SS were adapted to the 100-point system (Comba, 2018; Doğan et al., 2016). Accordingly, a minimum of 20 and a maximum of 100 points can be obtained from the SS. Akın (2007) found the reliability coefficient Cronbach's alpha value of the scale as 0.91. In this study, this scale was administered to 185 eighth grade students, who did not participate in the study, and the reliability value was calculated as 0.95.

FEEDBACK FORM (FF)

The feedback form (FF) developed to determine the effects of activities developed according to developmental self-theory on students' current mindsets. This form consists of two open-ended questions (Figure 2). The questions were administered in line with the cartoons in the Class Dojo platform, which was designed to develop a growth mindset, and the views of a science education expert.

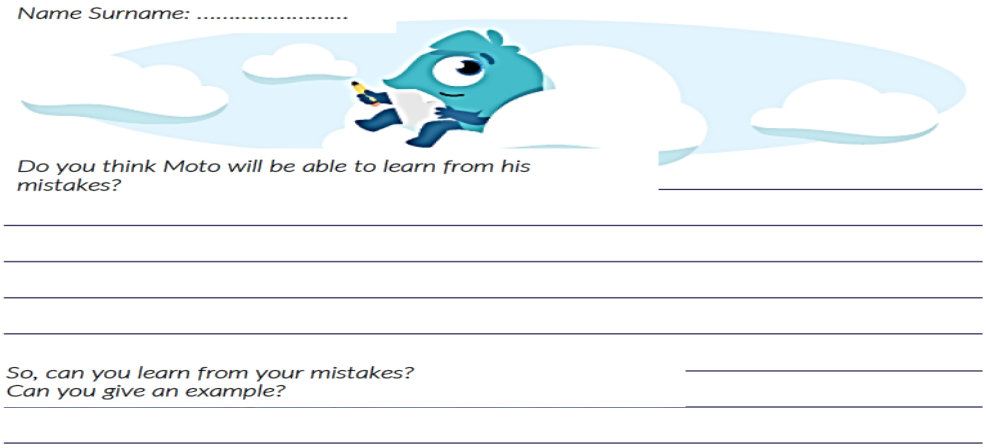

Figure 2. *Feedback Form Sample*

The answers the students gave to questions in the feedback form were cleansed of daily spoken language without losing it sense. Two people, one of whom was a researcher, coded collected qualitative data and another expert in the field, and the coding was repeated in two separate times in order to increase the reliability based on time. The results of the assessment were compared, consensus and disagreement were calculated and the percentage of reliability was found via the formula proposed by Miles and Huberman (1994):

$$Percentage\ of\ Consistency\ (P) = \frac{Na\ (Consensus)}{Na\ (Consensus) + Nd\ (Dissensus)}\ X\ 100$$

The studies in the literature recommended this value be greater than 85% to describe this value as reliable (Miles, Huberman & Saldana, 2014). The agreement of two coders was found 91% and it was seen that this value is acknowledged reliable in the literature.

TEACHING INTERVENTION

The procedure of the implementation including the cell and divisions unit activities designed in accordance with incremental self-theory, considering the unit acquisitions at the same time, is presented in Table 3.

Table 3. Implementation Procedure

Group	Pre-test	Implementation	Post-test
Control	Self-confidence Scale	2018 Science Curriculum	Self-confidence Scale
Experimental	Self-confidence Scale	Activities designed in accordance with incremental self-theory in addition to the current curriculum	Self-confidence Scale and Feedback Form

Dweck (2006) examined the effects of activities that support the growth mindset development on students' mathematics achievement, and the research was completed in 8 sessions and according to the results obtained, it was determined that the thinking styles of the students changed during the said period. In this direction, the research was carried out in 5 weeks and 4 lessons per week, in total 20 lesson hours.

TEACHING IN THE CONTROL GROUP

The self-confidence scale was administered as a pre-test to students in the control group one week before the unit. Later, the subjects in the cell and divisions unit were taught by the teacher in line with the present curriculum. After the completion of five-week teaching, the self-confidence scale, which had been administered as pre-test before, was administered as post-test.

TEACHING IN THE EXPERIMENTAL GROUP

The self-confidence scale was administered as a pre-test to students in the experimental group one week before the unit. After the unit was finished, the self-confidence scale, which were previously applied as a pre-test, were applied to the students again as a post-test. The materials and activities used in the experimental group different from the control group during the implementation phase are given below.

1. FEEDBACK SENTENCES

Studies have shown that students whose intelligence is praised tend to develop a fixed thinking style, while students whose effort is praised have a tendency to develop a growth mindset (Cimpian, Arce, Markman & Dweck, 2007; Mueller & Dweck, 1998; Truax, 2017). Accordingly, while feedback sentences that praise the effort, instead of intelligence, of the students were provided during teaching the cell and divisions unit in the experimental group, feedback sentences praising their intelligence instead of efforts, that would motivate them to develop fixed mindset were not used. Examples to the feedback sentences used and not used are presented in Table 4.

Table 4. Sample Feedback Sentences

Sentences supporting the development of growth mindset	Sentences supporting the development of fixed mindset
You work very hard, well done. I can see that he has improved himself in this regard. It is good for you not to give up when you fail, Where could you be making a mistake? It's a difficult question but you can deal with it. It is very nice that you come to the lesson prepared in advance. This is a very good answer, you should be studying hard, You know you can ask for help if you can't figure it out …	A very intelligent answer, You are the most intelligent in the class, .. is very intelligent, … is very intelligent, only he/she could solve this problem, If you try constantly you can find the correct answer (it is possible to experience a loss of self-confidence when failed to find the answer in many tries (Dweck, 2006), …

2. ANIMATED CARTOONS

The "Class Dojo" platform was used to support students' development of growth mindset. This platform is a communication portal that enables the students to share the things they have learned in the lesson with their classmates via pictures, videos and text messages. Class Dojo includes animated cartoons, designed to support growth mindset. The original sound track of these cartoons are English, but in this study these were translated into Turkish (Figure 3) using subtitles and speech balloons added to the videos, and they were presented to the students in the experimental group every week at the end of the lesson (Figure 4). The students were asked to express their opinions and views about the episode they watched.

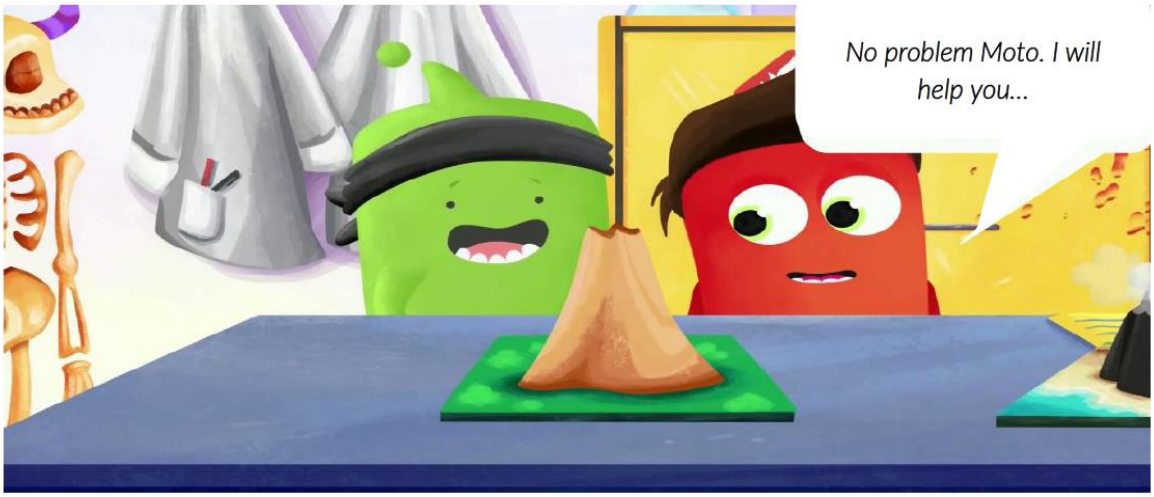

Figure 3. *A Screen Shot from Class Dojo Episode Two*

Figure 4. *Example Image of Experimental Group Watching Class Dojo*

To increase the growth mindsets and therefore increasing their self-confidence, personal notebooks and stickers using the Class Dojo characters the students selected, were distributed to the students (Figure 5).

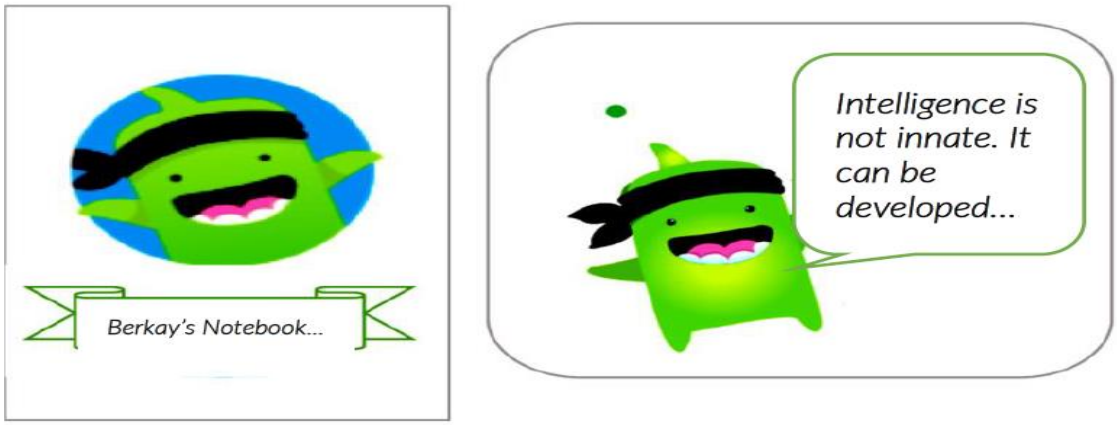

Figure 5. *Example Material-1 (Personal Notebook and Sticker)*

3. ADDITIONAL MATERIALS

Bookmark (Figure 6) and mini poster (Figure 7) containing persons that the students could take as role models were distributed to the students in the experimental group as materials supporting their self-confidence development process.

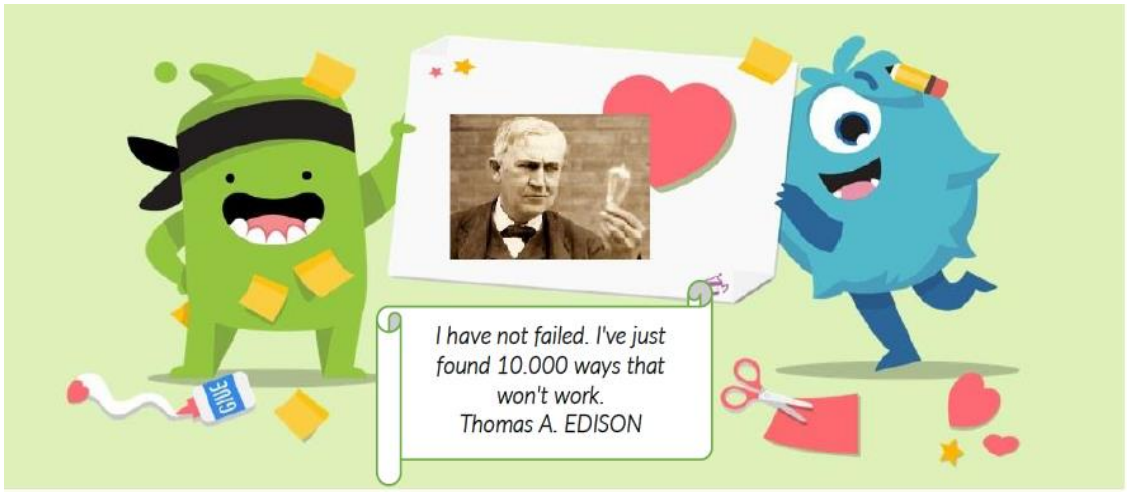

Figure 6. *Material-2 (Bookmark)*

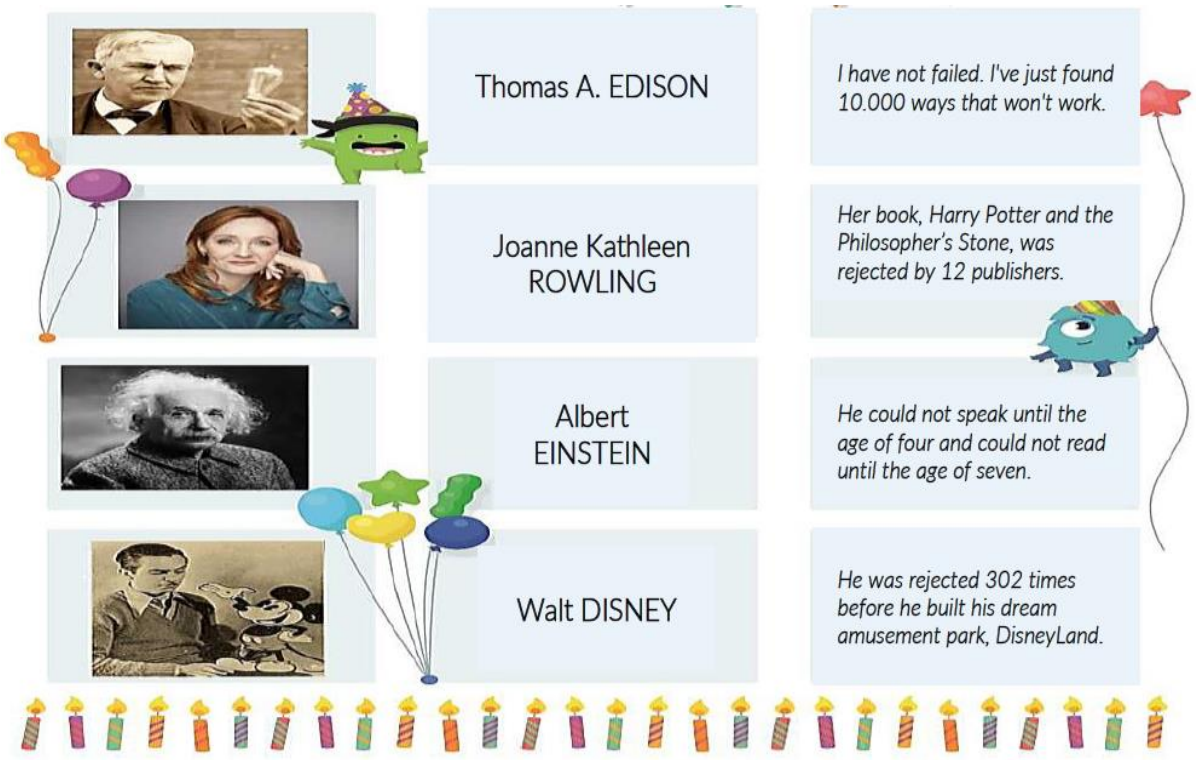

Figure 7. *Material-3 (Mini Poster)*

As mentioned during the implementation process, the subjects in the unit of cell and divisions are quite abstract and difficult for students to understand. Before starting the teaching of these subjects, activities were organized to help students develop a growth mindset, to attract their attention and to encourage them.

ANALYSIS OF THE DATA

ANALYSIS OF THE QUANTITATIVE DATA

In order to use the parametric tests in the analysis of data collected in the studies, the data should be normally distributed, interval/ratio variable, and have equal group variance (Kalaycı, 2010). Accordingly, to determine the appropriate tests for the analysis of the data obtained from the self-confidence test, the SPSS software package was used. It was first checked whether the data collected on which tests to use showed a normal distribution or not. Since the number of participants was less than 35, Shapiro and Wilk (1965) test was used. The findings are presented in Table 5.

Table 5. Normality Test Results of the SS

Scale	Implementation	Groups	N	$\bar{X}$	SD	*p*
Internal Self-confidence (SS_{int})	Pre-test	Control	27	85.93	10.97	.013*
		Experimental	27	88.50	7.63	.040*
	Post-test	Control	27	77.30	13.15	.155
		Experimental	27	87.35	14.67	.000*
External Self-confidence (SS_{ext})	Pre-test	Control	27	86.16	12.12	.004*
		Experimental	27	89.44	9.65	.006*
	Post-test	Control	27	78.01	15.74	.040*
		Experimental	27	87.78	14.82	.000*
Total Self-confidence (SS_{total})	Pre-test	Control	27	86.04	10.75	.015*
		Experimental	27	88.96	8.17	.046*
	Post-test	Control	27	77.64	13.90	.092
		Experimental	27	87.55	14.61	.000*

*$p < .05$

As seen in Table 5, within the scope of items related to internal self-confidence, it is seen that the pre-test scores and post-test experimental group scores do not comply with the normal distribution ($p < .05$), while the post-test control group scores comply with the normal distribution ($p > .05$). Within the scope of the items related to external self-confidence, it is seen that the pre-test and post-test scores do not comply with the normal distribution ($p < .05$). Within the scope of total self-confidence items, it is seen that the pre-test scores and post-test experimental group scores do not comply with the normal distribution ($p < .05$), while the post-test control group scores comply with the normal distribution ($p > .05$).

The data obtained from SS were tested in terms of the homogeneity of variances, which is a prerequisite for parametric tests, and the data obtained are presented in Table 6.

Table 6. Variance Homogeneity Results for the SS

Scale	Test	Levene	SD1	SD2	*p*
Internal Self-confidence (SS_{int})	Pre-test	2.06	1	52	.322
	Post-test	0.08	1	52	.011*
External Self-confidence (SS_{ext})	Pre-test	0.89	1	52	.275
	Post-test	0.35	1	52	.023*
Total Self-confidence (SS)	Pre-test	1.14	1	52	.290
	Post-test	0.01	1	52	.941

*$p < .05$

As seen in Table 6, within the scope of items related to internal self-confidence and items related to external self-confidence, it is observed that the variances of the pre-test scores show a homogeneous distribution ($p > .05$), while the variances of the post-test scores do not show a homogeneous distribution. Within the scope of total SS items, it is seen that the variances in terms of pre-test and post-test scores are homogeneous ($p > .05$).

When Table 5 and Table 6 are analyzed together within the scope of SS; due to the fact that the data obtained from the SS is not normally distributed in all subgroups and is not homogeneous in all groups within the framework

of internal and external self-confidence items, it was found appropriate to use the Mann-Whitney U Test, one of the non-parametric tests, in the analysis of the data. The findings obtained from the analyzes conducted within this scope were interpreted at a significance level of .05.

ANALYSİS OF THE QUALİTATİVE DATA

The data obtained from the feedback forms, administered to the students every week, were handled using descriptive analysis. The collected qualitative data were coded in line with the determined themes by a total of two people, one of them a researcher and a field expert, and the coding was repeated in two separate times in order to increase the reliability based on time. In its final form, the percentage of agreement between researchers was found to be 91, and the findings obtained in this direction are presented under the heading of findings.

ASSUMPTIONS AND LIMITATIONS

The research was conducted based on the assumption that the students answered the items in the scales sincerely and truly. In addition, the data of the research is limited to the data collected by using Self-confidence Scale and Feedback Forms from 54 students studying in the seventh grade in Kastamonu Province in Turkey.

RESEARCH ETHICS

As authors of the research, we declare that the study has no unethical problem and we observed research and publication ethics. Ethical principles and rules were followed during the planning, data collection, analysis and reporting of the research. Before starting the study, the necessary permission was obtained from the Kastamonu Provincial Directorate of National Education for the school to be researched, with the letter dated 16.09.2019 and numbered E.17120287. Ethical compliance approval was obtained for this research in accordance with the decision of Kastamonu University Social and Human Sciences Research and Publication Ethics Committee dated 12.10.2020 and numbered 3/14.

3 | FINDINGS

FINDINGS OBTAINED FROM THE QUANTITATIVE DATA

The self-confidence scale scores, internal self-confidence and external self-confidence scores for the pre-test and post-test implementations were subjected to Mann Whitney-U test to determine whether the activities implemented were effective on students' self-confidence. The data are presented in Table 7.

Table 7. Inter-group Pre-test Post-test Results of the SS

Scale	Test	Group	N	Mean of Ranks	Sum of Ranks	U	*p*
Total Self-confidence (SS_{total})	Pre-test	Control	27	25.74	695.00	317.00	.411
		Experimental	27	29.26	790.00		
	Post-test	Control	27	21.00	567.00	189.00	.002*
		Experimental	27	34.00	918.00		
Internal Self-confidence (SS_{int})	Pre-test	Control	27	26.00	702.00	324.00	.483
		Experimental	27	29.00	783.00		
	Post-test	Control	27	21.07	569.00	191.00	.003*
		Experimental	27	33.93	916.00		
External Self-confidence (SS_{ext})	Pre-test	Control	27	25.20	680.50	302.50	.281
		Experimental	27	29.80	804.50		
	Post-test	Control	27	21.74	587.00	209.00	.007*
		Experimental	27	33.26	898.00		

*$p < .05$

When Table 7 is examined, it is seen that while there was no statistically significant difference between the groups regarding self-confidence before the implementation (U=317.00; $p > .05$), a statistically significant difference emerged in favor of the experimental group after the implementation (U=189.00; $p < .05$). This indicates

that self-confidence of the students in the experimental group, in which the activities designed in accordance with incremental self-theory, when compared to the students in the control group.

In order to scrutinize the change in internal self-confidence and external self-confidence of the students, the internal self-confidence and external self-confidence scores were also examined. The results obtained revealed that there was no significant difference, for both internal and external self-confidence, between groups before the implementation ($U_{\text{internal self-confidence}}$=324.00; p> .05, $U_{\text{external self-confidence}}$=302.50; p> .05); however, a significant difference in favor of the experimental group students arose for both internal and external self-confidence ($U_{\text{internal self-confidence}}$=191.00; p< .05, $U_{\text{external self-confidence}}$=209.00; p< .05).

FINDINGS OBTAINED FROM THE QUANTITATIVE DATA

The data obtained via the feedback forms administered every week were analyzed using descriptive analysis. The themes and code are presented below as titles with their percentage and frequency values.

Week 1: Codes Obtained Under the Theme Improvability of Intelligence

The codes and associated codes obtained from the feedback form administered in the first week under the theme improvability of intelligence are presented in Table 8.

Table 8. Descriptive Analysis Result for the FF Under Improvability of Intelligence Theme

Week	Theme	Student	Code	Associated Code
Week 1	Improvability of intelligence	S1	Intelligence is improvable	Studying, Achievement
		S2	Intelligence is improvable	Studying
		S3	Intelligence is improvable	Make an effort
		S4	Intelligence is improvable	Studying, Achievement
		S5	Intelligence is improvable	Studying
		S6	Intelligence is improvable	Studying
		S7	Intelligence is improvable	Studying, Make an effort
		S8	Intelligence is improvable	Make an effort, Not giving up, Studying
		S9	Intelligence is improvable	The reason is not specified
		S10	Intelligence is improvable	Studying, Repetition
		S11	Intelligence is improvable	Studying, Repetition
		S12	Intelligence is improvable	Studying, Make an effort
		S13	Intelligence is improvable	Studying, Achievement
		S14	Intelligence is improvable	The reason is not specified
		S15	Intelligence is improvable	Studying
		S16	Intelligence is improvable	Studying, Achievement
		S17	Intelligence is improvable	Studying, Achievement
		S18	Intelligence is improvable	Studying, Achievement
		S19	Intelligence is improvable	Studying, Repetition
		S20	Intelligence is improvable	The reason is not specified
		S21	Intelligence is improvable	The reason is not specified
		S22	Intelligence is not improvable	I am intelligent
		S23	Intelligence is not improvable	I am not intelligence, even when I study
		S24	Intelligence is improvable	Not giving up, Studying, Make an effort
		S25	Intelligence is improvable	The reason is not specified
		S26	Intelligence is improvable	Studying
		S27	Intelligence is improvable	Studying

As seen in Table 8, the codes and associated codes under the improvability of intelligence theme could be seen, which were obtained from the feedback form administered to the students in the first week. The percentage and frequency distributions of these codes are presented in Table 9.

Table 9. f and % Values for the Codes Obtained Under Improvability of Intelligence Theme

Code	f	%	Associated Code	f	%
Intelligence is improvable	25	92.59	Without reason	5	20
			Studying	19	76
			Achievement	6	24
			Making effort	5	20
			Not giving up	2	8
			Repetition	3	12
Intelligence is not improvable	2	7.41	intelligent	1	50
			Not intelligent even when study	1	50

Note: Some students did not attend the feedback form implementation in the following weeks.

When Table 9 is examined, it is seen that 92.59% of the students believed that intelligence could be improved, while 7.41% of them believed that it could not be improved. While 20% of the students that believe improvability of intelligence did not relate this to any term, other students stated that intelligence could be improved by studying (76%), making effort (20%), repetition (12%) and not giving up (8%). 24% of the students that believe intelligence is an improvable trait think that improved intelligence would increase their achievement.

Sample expressions from the answers given by the students to the questions in FF are given in the follow:

S1: *"I think Moto can be smarter because everyone can work and be successful. And if I work hard, I can be successful in many things."*

S8: *"Moto does not struggle with difficulties and gives up, but I don't think it should be like that. Because life is full of challenges. I think it works, it should work. I think I can improve my brain too. The secret is to work."*

Week 2: Codes Obtained Under Instructiveness of the Mistakes Theme

The codes and associated codes obtained from the feedback form administered in the second week under the theme instructiveness of mistakes are presented in Table 10.

Table 10. Descriptive Analysis Result for the FF Under Instructive of Mistakes Theme

Week	Theme	Student	Code	Associated Code
Week 2	Instructive of mistakes	S1	Mistakes are instructive	Not giving up, Better results
		S2	Mistakes are instructive	Not giving up, Better results
		S3	Mistakes are instructive	Not doing the same mistake again, Better results
		S4	Mistakes are instructive	Studying harder
		S5	Mistakes are instructive	Studying harder
		S6	Mistakes are instructive	Not doing the same mistake again, Better results
		S7	Mistakes are instructive	Not doing the same mistake again, Better results
		S8	Mistakes are instructive	Permanent learning
		S9	Mistakes are sometimes instructive	The reason is not specified
		S10	Mistakes are instructive	Not doing the same mistake again, Better results
		S11	Mistakes are instructive	Not doing the same mistake again, Better results
		S12	Mistakes are instructive	Studying harder
		S13	Mistakes are instructive	The reason is not specified
		S14	Mistakes are instructive	Permanent learning
		S15	Mistakes are instructive	The reason is not specified
		S16	Mistakes are instructive	Peer support
		S17	Mistakes are instructive	The reason is not specified
		S18	Mistakes are instructive	Not giving up, Better results
		S19	Mistakes are instructive	Peer support
		S20	Mistakes are instructive	Not doing the same mistake again, Better results
		S21	Mistakes are instructive	Studying harder
		S22	Mistakes are instructive	Not doing the same mistake again, Better

			results
	S23	Mistakes are instructive	Not doing the same mistake again, Better results
	S24	Mistakes are instructive	Not doing the same mistake again, Better results

As seen in Table 10, the codes and associated codes under the instructiveness of mistakes theme could be seen, which were obtained from the feedback form administered to the students in the second week. The percentage and frequency distributions of these codes are presented in Table 11.

Table 11. f and % Values for the Codes Obtained Under Instructive of Mistakes Theme

Code	f	%	Associated Code	f	%
Mistakes are instructive	23	95.83	Without reason	3	13.04
			Not giving up-better results	3	13.04
			Not making the same mistake again-better results	9	39.13
			Studying harder	4	17.39
			Permanent learning	2	8.69
			Peer Support	2	8.69
Mistakes are sometimes instructive	1	4.17	The reason is not specified	1	100

When Table 11 is examined, it is seen that 95.83% of the students believed that mistakes are instructive, while 4.17% of them believed that mistakes are sometimes instructive. While 13.04% of the students that believe mistakes are instructive did not relate this to any term, other students stated that they got better results when they did not give up (13.04%), making mistakes prevented them doing mistakes again and therefore they got better results (39.13%). The student also state that they studied harder when they made a mistake (17.39%), they receive peer support (8.69%), and the making mistakes helped them in permanent learning (8.69%).

Sample expressions from the answers given by the students to the questions in FF are given in the follow:

S3: *"Yes, he will be able to. Yes, I wrote a bad story. I tried to fix the bad parts. It was very nice."*

S7: *"I think he will be able to succeed because he can realize his mistakes and make a robot without making those mistakes again. I can learn from my mistakes. For example, when I should have dribbled with my left hand in a basketball game, I dribbled with my right hand and lost the ball to my opponent. But in the next game, I dribbled the ball with my left hand and scored a basket."*

Week 3: Codes Obtained Under Seeking Help Theme

The codes and associated codes obtained from the feedback form administered in the third week under the theme seeking help in case of failure are presented in Table 12.

Table 12. Descriptive Analysis Result for the FF Under Seeking Help Theme

Week	Theme	Student	Code	Associated Code
Week 3	Seeking help	S1	Getting help from peer in case of failure	The reason is not specified
		S2	Getting help from peer in case of failure	Helps learning, nothing to be embarrassed of
		S3	Getting help from peer in case of failure	Not a bad thing
		S4	Getting help from peer in case of failure	nothing to be embarrassed of
		S5	Getting help from peer in case of failure	Helps learning
		S6	Getting help from peer in case of failure	The reason is not specified
		S7	Getting help from peer in case of failure	The reason is not specified
		S8	Getting help from peer in case of failure	Helps learning nothing to be embarrassed of
		S9	Getting help from peer in case of failure	Not a bad thing

	S10	Getting help from peer in case of failure	Helps learning
	S11	Getting help from peer in case of failure	Better results
	S12	Getting help from peer in case of failure	Helps learning
	S13	Getting help from peer in case of failure	nothing to be embarrassed of
	S14	Getting help from peer in case of failure	Helps learning
	S15	Getting help from peer in case of failure	Nothing to be embarrassed of
	S16	Not getting help from peer in case of failure	Trying to access more information
	S17	Getting help from peer in case of failure	Not a bad thing
	S18	Getting help from peer in case of failure	Helps learning
	S19	Getting help from peer in case of failure	Helps learning
	S20	Getting help from peer in case of failure	The reason is not specified
	S21	Not getting help from peer in case of failure	Seeking teacher's help
	S22	Getting help from peer in case of failure	The reason is not specified

As seen in Table 12, the codes and associated codes under the seeking help in case of a failure theme could be seen, which were obtained from the feedback form administered to the students in the third week. The percentage and frequency distributions of these codes are presented in Table 13.

Table 13. f and % Values for the Codes Obtained Under Seeking Help Theme

Code	f	%	Associated Code	f	%
Getting help from peer in case of failure	20	90.91	Without reason	5	25
			Helps learning	8	40
			Nothing to be embarrassed of	5	25
			Not a bad thing	3	15
			Better results	1	5
Not getting help from peer in case of failure	2	9.09	Trying to access more information	1	50
			Seeking teacher's help	1	50

As seen in Table 13, While 90.91% of the students stated that they could seek help from their peers when they were unachievement, 9.09% of them emphasized that they would not ask for help from their peers when they were unachievement. Half of the students (50%) who stated that they would not seek peer help would try to access more information in this case, while the other half would seek help from their teacher. While 25% of the students who stated that they could request peer help in case of failure did not associate it with any term, other students stated that it helped them learn (40%), there were nothing to be embarrassed of (25%) and a bad thing (15%).

Sample expressions from the answers given by the students to the questions in FF are given in the follow:

S4: *"I used to do it like Mojo. Because I would learn that I did not know. Why should I be ashamed!"*

S17: *"Like Mojo, I would ask Brus for help. Because helping others and getting help is good."*

Week 4: Codes Obtained Under Competing Against Failure Theme

The codes and associated codes obtained from the feedback form administered in the fourth week under the theme competing against failure are presented in Table 14.

Table 14. Descriptive Analysis Result for the FF Under Competing Against Failure Theme

Week	Theme	Student	Code	Associated Code
Week 4	Competing against failure	S1	I compete against failure	Studying harder, Not giving up
		S2	I compete against failure	Studying harder, Not giving way to despair
		S3	I compete against failure	Studying harder, Not giving up
		S4	I compete against failure	Not giving up
		S5	I compete against failure	Studying harder, Not giving up
		S6	I compete against failure	Studying harder, Seeking help
		S7	I compete against failure	Studying harder, Not giving up
		S8	I compete against failure	Studying harder
		S9	I compete against failure	Studying harder
		S10	I compete against failure	Studying harder
		S11	I compete against failure	Not giving up
		S12	I compete against failure	Not giving up
		S13	I compete against failure	Studying harder
		S14	I compete against failure	Learning lessons from mistakes
		S15	I compete against failure	Studying harder, Seeking help
		S16	I compete against failure	Studying harder, Not giving up
		S17	I compete against failure	Studying harder, Not giving up
		S18	I compete against failure	Studying harder, Not giving up
		S19	I compete against failure	Studying harder
		S20	I compete against failure	Not giving up
		S21	I compete against failure	Not giving up
		S22	I compete against failure	Studying harder, Not giving up
		S23	I compete against failure	Studying harder, Seeking help
		S24	I compete against failure	Studying harder, Believing in achievement

As seen in Table 14, the codes and associated codes under the competing against failure theme could be seen, which were obtained from the feedback form administered to the students in the fourth week. The percentage and frequency distributions of these codes are presented in Table 15.

Table 15. f and % Values for the Codes Obtained Under Competing Against Failure Theme

Code	f	%	Associated Code	f	%
Compete against failure	24	100	Studying harder	18	75.00
			Not giving up	13	54.17
			Seeking help	3	12.50
			Not giving way to despair	1	4.17
			Learning lessons from mistakes	1	4.17
			Believing in achievement	1	4.17

When Table 15 is examined, it is seen that all of the students (100%) stated that they knew what to do when they failed. In this respect, the students stated that they would study harder (75%), not give up (54.17%), seek help (12.5%), not give way to despair (4.17%), learn lessons from their mistakes (4.17%), and believe in themselves to be achievement (4.17%).

Sample expressions from the answers given by the students to the questions in FF are given in the follow:

S1: *"I work harder. I won't give up right away. Because our brain develops as it works."*

S16: *"I work and struggle to be better."*

4 | DISCUSSION & CONCLUSION

In the study, it is found, based on the finding obtained from the self-confidence scale, that the activities designed in accordance with incremental self-theory increased the self-confidence levels of the students. These activities affected positively both the inner and outer confidence of the students, and therefore contributed to the increase in the total level of self-confidence. The findings obtained from the feedback forms administered every week to determine the changes in the students' mindsets confirm this result.

Despite the scarcity of studies on the effect of activities designed in accordance with incremental self-theory on self-confidence, Vealey, Chase and Cooley (2017) found that the mindsets of young sportspeople about the skills they had developed had a significant impact on their self-confidence and motivation. Similarly, Masters (2013), in his study that defined three basic approaches to evaluate learning outcomes and provide feedback, found that the achievement and motivation of the students increased, as their efforts and struggles had been praised. These results support the finding of this study that activities for developing incremental self-theory has a self-confidence enhancing effect.

According to Dweck (2006), the self-confidence of people with a fixed mindset is more fragile due to the way of thinking they adopt in the face of the problems and difficulties they experience. In this context, it has been determined that students with a growth mindset have more positive relationships with their social environment and react less aggressively to the achievement s of others compared to students with fixed mindset.

When the findings obtained from the feedback forms in the study were examined, it was seen that the students in the experimental group developed a combative attitude, which is one of the general characteristics of individuals with a growth mindset. These results correspond to the results of O'Brien and Lomas (2017), who investigated the effects of mindset developing activities in an open-air personal development course. In addition, some studies on this subject show that students with fixed thinking styles can exhibit behaviors such as weak self-esteem, anxiety, and timidity (Pueschel & Tucker, 2018).

According to the data obtained from the feedback forms applied to the students in the first week, 25 of the 27 students who participated in the study stated that "intelligence is improvable" through study, achievement, effort and repetition. Two students stated that "intelligence is not improvable" even if you study. In the second week, feedback forms were applied to 24 students. According to the data obtained this week, 23 of the students mentioned that "mistakes are instructive". They stated the reasons for this situation as "not giving up, "better results", "studying harder", "permanent learning", "not doing the same mistake again" and such that. One student mentioned that "mistakes are sometimes instructive". In the third week, feedback forms were applied to 22 students. According to the data obtained this week, 20 of the students stated that "getting help from peers in case of failure. They state the reasons for this as "helps learning", "nothing to be embarrassed of", "helps learning", "the reason is not specified", better results and such that. Two students stated that "not getting help from peers in case of failure". They stated the reason for this as "trying to access more information" and seeking teacher's help". In the fourth week, feedback forms were applied to 24 students. According to the data obtained this week, all students stated that "I compete against failure". They state the reasons for this as "studying harder, not giving way to despair", "studying harder", "studying harder, believing in achievement" and such that.

According to the results obtained from the feedback forms, it was determined that the majority of the students participating in the study had positive a growth mindset and they were trying to develop their growth mindset further with the activities designed according to the incremental self-theory. Studies conducted in this context have found that students with a growth mindset have more positive relationships with their social environment and less aggressive reactions to the achievement of others than students with a fixed mindset (Verberg, Helmond & Overbeek, 2018; Yeager et al., 2014). Nussbaum and Dweck (2008) found that individuals with a fixed mindset tend to develop stress, anxiety and depression in the face of failure. In this context, it is stated that practices that support the development of growth mindset have an effect on reducing the level of anxiety and stress in the classroom (Schleider & Weisz, 2018; Schroder et al., 2017). In this context, a recent study shows that interventions that support growth mindset in nurse education have a positive effect on increasing students' self-confidence (Warren, 2021).

SUGGESTIONS

Within the scope of the research, it is thought that it would be beneficial to integrate the teaching, which is designed in line with the incremental self-theory, whose implementation process is very easy and does not interfere with the curriculum of any course, by integrating it with other courses and subjects where students have low self-confidence. In this study, it was seen that developmental self-theory had a positive effect on students' self-confidence in the cell and divisions unit. The more studies that have been done, the better insights can be gained into the pervasive impact of this theory. Since the researches provide evidence that the way of thinking of teachers

affects the way of thinking of their students, teachers can contribute to the development of their students' growth mindset by improving their current growth mindset.

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STATEMENTS OF PUBLICATION ETHICS

As authors of the research, we declare that the study has no unethical problem and we observed research and publication ethics. Ethical principles and rules were followed during the planning, data collection, analysis and reporting of the research. Ethical compliance approval was obtained for this research in accordance with the decision of Kastamonu University Social and Human Sciences Research and Publication Ethics Committee dated 12.10.2020 and numbered 3/14.

RESEARCHERS' CONTRIBUTION RATE

The study was conducted and reported with equal collaboration of the researchers.

CONFLICT OF INTEREST

The authors declare that they have no conflicts of interest.

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