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ANALYSIS OF EIGHTH GRADE STUDENTS' ACADEMIC ACHIEVEMENTS IN SEASONS AND CLIMATE UNIT

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Abstract
The main purpose of this study is to analyze the academic achievement of the eighth grade students in the Seasons and Climate unit. Homogeneous (analogous) samples were used in the study. A total of 140 students participated in the study, depending on the volunteerism principle. Academic achievement test was used to collect quantitative data. Qualitative data were collected through a fully structured interview form. Data were analyzed with the help of Microsoft Excel and SPSS programs. Descriptive and content analyzes and a technique such as Cronbach's Alpha value, frequency and percentage was used. According to the findings; It was determined that the students' academic achievements in seasons and climate units were at a good level. It was determined that the majority of the students stated that the seasons occurred because of the Earth's rotation around the Sun and the tilting axis of the Earth. The students mentioned the climate as the average weather events, covering large areas and covering many years. Also they stated that weather events are daily in short periods in a narrow region. As a result, it is determined that the knowledge of students about seasons and climate unit provides a good level of academic achievement. Recommendations were made in parallel with the results.

Keywords: Academic achievement, Analysis, Climate, Science, Seasons, Weather events.

INTRODUCTION

Science enables the curiosity of the individual towards the universe and nature. From the moment we were born, it was understood that many subjects were related to science. It is so relevant to the many incidents we face in everyday life that we strive to understand. Science is a course that enables the understanding of natural phenomena and information. Storms, precipitation, winds, droughts or greenery can be defined as natural events (Coştu, Ünal and Ayas, 2007). The individual learns these phenomena and the many situations they encounter in everyday life through science. The individual renews many of his knowledge with the seasons and climate unit especially at school (Gedik, Altıntaş and Kaya, 2011; Lemke, 2001).

According to the renewed science curriculum; students describe seasons and climate, associates with daily life, present examples and learn the reasons for their occurrence in seasons and climate units (MEB, 2018). According to this, the world's rotation around the Sun and the axis inclination of its seasons create seasons. Spring, summer, autumn and winter seasons are available. In the formation of these seasons, the angle of arrival of the sun rays also affects (Türk, Alemdar and Kalkan, 2012). The climate is another important issue with the seasons. Climate is defined as the average status of all weather conditions experienced or observed over many years. Climate is like the experience accumulated over many years for a large area. It gives information such as where the rainy, dry, hot or frost events are experienced (Brando et al., 2010; Demir, Kılıç and Coşkun, 2008). Variability data is extremely low in climate. Another phenomenon that lives in our daily life together with climate is weather events. Weather events are estimated data for short periods of time in narrow spaces (Birkenholtz, 2011). Values are likely to change. It gives information about daily temperatures, rainfall and wind or storm conditions of a city or town (MEB, 2018; Wang and An, 2005).

Another aim of the science curriculum is to educate individuals with 21st century skills. The ability of the individual to transfer what he / she learned to real life is considered to be one of these skills

(Bakırcı & Kutlu, 2018; Gülen, 2018). The program aims to raise individuals who are successful in investigating, examining, linking daily life with science subjects and solving problems they face in life (Tan & Temiz, 2003). The individual aims to observe the events around him / her like the scientist and to integrate them with what they have learned in the science course (DeBoer, 2000; Yağbasan & Gülçiçek, 2003). Learning the individual's ability to transfer what they have learned in their school environment to their daily life shows his academic achievement (Demirkis, 2019).

The academic achievement of a student in school means that the individual learns the subjects and can use them in his daily life (Türkeş, 2001). Especially in the seasons and climate unit thanks to the information learned the academic success of the individual shows that they can understand the relations between Earth and Sun. The academic success of the individual may occur as a result of understanding; Earth and Sun position, Earth's axis training and the effect of the sun's rays on the seasons (Türk & Kalkan, 2017). This is an indicator for academic success. In addition, the relationship between the seasons and climate and the relationship between climate and weather is also an indicator of academic achievement (Garreaud, 2009; Riehl, 1979).

In literature review, it is possible to come across many researches about the relationship between Earth, Sun and Moon, effects on the world, seasons and climate issues (Coştu, Ünal and Ayas, 2007; Gülen & Demirkuş, 2014a;b; Gulum, 2009; Trumper, 2006; Turk & Kalkan, 2017; Turk, Alemdar & Kalkan, 2012). However, there are no studies to determine the indicators of the academic achievement of the students. In addition, no studies were conducted to analyze the data regarding the seasons and climate issues by using mixed method. Unlike the studies in the literature, this study aims to determine the indicators of students' academic achievement. It is aimed to analyze the success of the academic achievement values obtained by quantitative methods with the values obtained by the qualitative method.

Purpose of the research

The main purpose of this study is to analyze the academic achievement of the eighth grade students in the Seasons and Climate unit. For this purpose, the answers to the following questions were sought.

1. What level are the students' academic achievements in the Seasons and Climate unit?
2. What are the indicators of academic achievement in the Seasons and Climate unit?

METHOD

The mixed method was used in the research. In the mixed method, it is aimed to close the deficiencies in the solution of the research problems with both qualitative and quantitative data (Büyüköztürk, 2009; Çepni, 2010; Yıldırım & Şimşek, 2013). Qualitative data were collected together with quantitative data.

Participants

Homogeneous (analogous) samples were used in the study. The aim in the analogous sample is to determine the status of groups of similar characteristics in a subject in order to collect the data effectively (Creswell, 2013). The research was conducted with 8th grade students in a public school in Eastern Anatolia Region during the 2018-2019 academic years. A total of 140 students participated in the study, depending on the volunteerism principle. 140 participants answered the academic achievement test and 126 participants participated in the fully structured interview form. Because 14 students were found to leave the form blank and they were not processed. The socio-economic status of the participants was similar. Socio-economic status of participants; the majority of the parents are farmers. Farming is to do animal feeding and agricultural at a level that only meets their needs. Only barley and wheat are grown as agricultural products. Very few parents of participants are shopkeepers. None of the participants had a higher income. The district where the study is conducted is quite rare. This district is steep and mountainous in eastern Anatolia. In addition, in the beginning

of the 2018-2019 academic years, participants conducted research on seasons and climate unit. This unit has been discussed and learned in class.

Data collection tools

Academic achievement test was used to collect quantitative data. Qualitative data were collected through a fully structured interview form. In the fully structured interview form, the following questions were used.

1. How do the seasons occur? Do you write all you know?
2. What do you know about climate and weather events? Please write.

Analysis of data

Data were analyzed with the help of Microsoft Excel and SPSS programs. Descriptive and content analyzes and a technique such as Cronbach's Alpha value, frequency and percentage was used.

Each correct answer in the academic achievement test was evaluated as 1 point. As a total of 12 questions, the student who has answered all the questions correctly gets 12 points. These points have been converted into a hundred-point system for more objective evaluation of the data.

The data of the fully structured interview form were analyzed both in terms of descriptive and content in order to determine the thoughts about seasons and climate. The data obtained by both analysis methods are presented in the findings section.

The score range of the academic achievement test was evaluated according to the criteria given in Table 1. In this table, values are given according to the number of points.

Table 1: Interpretation range of scores

Order	Value	Range for academic achievement test
1	Very bad	00.01 - 20
2	Bad	20.01 - 40
3	Middle	40.01 - 60
4	Good	60.01 - 80
5	Very good	80.01 - 100

As seen in Table 1, five equal intervals were determined for more precise interpretation. According to this, it is very bad, bad, middle, good and very good value for academic achievement test. Kandemir (2015) has similar criteria to this table in his study.

Reliability and Validity

Within the scope of the reliability studies, the status of the sample group was explained in detail, the existing roles were explained, the conceptual framework and data collection and analysis were presented. In addition, these data were supported by descriptive analysis and content analysis (Merriam, 2013). The fully structured interview form used is based on expert opinion. The analyses received help from the teachers. In addition, Cronbach's Alpha value of academic achievement test was calculated as 0.78. In addition, item difficulty index was calculated as 0.75 and item discrimination index was 0.45. According to this, the item difficulty index is 0.75 and it is an easy test. However, the item discrimination index of 0.45 indicates that it is capable of distinguishing between the known and the unknown (Büyüköztürk, 2009). For the coding and scoring, reliability was calculated by using the formula of Miles and Huberman (1994). According to this calculation, 89 % confidence coding was performed throughout the study. In fact, according to Miles & Huberman (1994) 80% and above has been accepted as reliable (Arik & Yilmaz, 2017). In the descriptive and content analysis of validity of the research, direct quotations were given and the accuracy of the research results was shown (Glesne, 2013). The codes used in the content analysis and the

interpretations were done in depth. In addition, unit gains were taken into consideration in terms of the scope validity of the academic achievement test. Academic achievement test was conducted with researcher and lesson teacher. In the preparation of unit gains were taken into consideration. Academic achievement test; 12 questions were prepared according to 2 wins in seasons and climate unit. While 6 of the questions were related to the seasons, 6 of them were related to climate. There are weather events about climate. The questions were prepared to cover both subjects. Validity values such as structure and appearance are obtained by taking expert opinion (Yıldırım & Şimşek, 2013).

FINDINGS

The qualitative and quantitative findings of the study are presented below.

Findings obtained from the academic achievement test; the results obtained from the analysis of the achievement test are given in Table 2.

Table 2: Statistical success of academic achievement test

Test	N	Standard deviation	Average	Percent (%)	Comment
Academic achievement test	140	2.51	9.51	79.75	Good

According to Table 2, the average score of students showing their academic achievement is 9.51, and this score is 79.75 about percentage system. It also shows that this score in the percentage system is "good" level according to the criteria in Table 1.

Findings from the fully structured interview form; all data obtained from both the descriptive and content analyzes of the fully structured interview form are presented below. The most frequently repeated statements in the interview form are presented in Table 3.

Table 3: Most repetitive expressions

Order	Expressions (N: 126)	Frequency (f)	Percentage (%)
1	Climate covers a wide area.	105	83.33
2	Weather events cover a narrow area.	95	75.40
3	Climate covers long years.	90	71.43
4	Seasons, occurs when the Earth revolves around the Sun and thanks to axis inclination of Earth	84	66.67
5	Weather events are experienced in a short time.	75	59.52
6	Weather events are estimated values.	56	44.44
7	There is certainty in climate.	53	42.06
8	Climatology-climatologists	45	35.71
9	Meteorology-Meteorologist	42	33.33
10	Weather events constantly change.	22	17.46

The three most frequently repeated statements according to Table 3 are "*climate covers a large area*", "*covers a narrow area of weather events*" and "*climate covers many years*". The frequency of these three expressions is over 90 and corresponds to the majority of the participants (70% and above).

According to the table, it is understood that participants can use expressions both in terms of seasons and climate. It is understood that most of the participants have knowledge about the seasons and climate unit.

The theme-category and codes obtained as a result of content analysis of fully structured interview form data are presented below.

Theme 1: Seasonal Creation
Under this theme, participants are presented with accurate, incomplete and incorrect information about the formation of the seasons. Table 4 depicts this situation.

Table 4:Descriptive values under the theme of the formation of seasons

Theme-Category-Codes		Frequency (f)	Percentage (%)
Theme 1	**Seasonal Creation (N: 126)**		
Category 1	*Accurate Expressions*		
	Seasons, occurs when the Earth revolves around the Sun and thanks to axis inclination of Earth	84	66.67
Category 2	*Missing and Wrong Expressions*		
	When the Earth revolves around the Sun, seasons occur.	13	10.32
	Season occurs when the Earth revolves around itself and the Sun.	9	7.14
	Seasons; spring, summer, autumn and winter.	7	5.56
	When the Earth revolves around itself, seasons occur.	7	5.56
	The seasons occur with the distance of the Earth from the Sun.	6	4.76

In Table 4, the participants have the correct expressions, missing and incorrect expressions categories under the theme of the formation of seasons. Accordingly, 84 of the participants (66.67% of the respondents) made the right statements. In addition, 10.32% of respondents stated that the seasons occurred only when the Earth revolved around the Sun. Apart from this, it is seen that the Earth is present in the wrong information as the seasons occur because of the rotation of the Earth itself or the distance of the Earth from the Sun. The citations for this theme are presented below.

Accurate Expressions
The correct expressions used by the participants to create the seasons under this category are presented as follows (Quotations randomly selected):
The seasons occur as the axis of rotation of the Earth is educated and also revolves around the Sun.
There are 4 seasons in 1 year. When the sun's rays are perpendicular to the northern hemisphere and the dike comes close to the angles, the summer is experienced. At that time, the southern hemisphere is winter (P5).
Earth inclination causes different seasons in different places. It also occurs because of the Earth's rotation around the Sun and the different angles of the rays coming from the Sun when it rotates (P27).
The seasons occur as a result of the earth around the sun and axis of rotation of the Earth (P47).
The rotation of the Earth around the Sun and the tilt of the Earth's axis of rotation provide this. If the world always returned at the same angle always lived in the same season (P55).
Seasons are formed by the tilt of the Earth's rotation axis and the rotation of the Sun (P77).
The axis of the earth is tilted (23 degrees 27 minutes) and the sun is rotating (P110).

As it is understood from the quotations above, it is stated that the "*seasons occurred*" as a result of activities such as "*rotation of the Earth*" and rotation of the "*axis*". It is also determined that the angles of the "*sun's rays*" are effective in the formation of the seasons. In general, it can be said that the majority of the participants stated that the seasons were formed due to the Earth's rotation around the Sun and the tilting axis of the Earth. Apart from these explanations, it was determined that they were missing and wrong statements. These statements are presented below.

Missing and Wrong Expressions
Under this category, the missing and incorrect expressions used by the participants in forming the seasons are presented. Firstly missing statements are given:
The seasons are caused by the Earth's entanglement around the Sun (P6).
The earth wanders around the sun and the seasons are formed by the return of 365 days and 6 hours (P123).
The seasons occur when the Earth revolves around itself and the Sun (P10).
Seasonal spring, summer, autumn and winter (P121).
The above quotations show that the participants stated that the seasons occurred as a result of the "*Earth's rotation*" around the "*Sun*". It is also stated that the seasons are "*spring, summer, autumn and winter".* It can be said that some participants lack the information about the seasons. Apart from these explanations, it was also determined that some participants presented incorrect information. These statements are presented below.
Rotation of the Earth around its axis (P79).
Earth's distance to the Sun (P43).
When the Sun revolves around the Earth, seasons occur (P94).

As it is understood from the quotations above, it was determined that some participants stated that the "*seasons*" were formed by the Earth "*turning*" around its "*axis*", the "*distance*" of the Earth to the Sun and the Sun "*turning*" around the "*Earth*". Although there are very few in general, it can be said that some participants have misinformation about seasons.
It can be said that the majority of the participants use the correct expressions regarding the formation of the seasons under the theme of seasons. The seasons are caused by the Earth's rotation around the Sun and the tilting axis of the Earth. In addition, the second theme obtained in content analysis is presented below.

Theme 2: Climate and Weather Events
Under this theme, participants' information about climate and weather events is categorized into two categories. The descriptive values of this theme are presented in Table 5.

Table 5: Descriptive values under climate and weather events

Theme-Category-Codes		Frequency (f)	Percentage (%)
Theme 2	**Climate and Weather Events (N: 126)**		
Category 1	*Characteristics of climate*	126	100.00
	Features		
	Covers a large area	105	83.33
	Covers long years	90	71.43
	There is certainty	53	42.06
	Climatology-climatologists	45	35.71
	Average weather events	15	11.90
	Hot-dry-cold-rainy	14	11.11

Category 2	*Characteristics of weather events*	126	100.00
	Features		
	Covers a narrow area	95	75.40
	Covers short periods	75	59.52
	Estimated values (Daily)	56	44.44
	Weather-meteorologist	42	33.33
	Changes continuously	22	17.46
	Misty-wind-rain-snow-filled	16	12.70

Table 5 presents the frequency and percentage values of the participants' expressions used for climate and weather events. All participants were found to use at least one expression. In addition, it was determined that some participants used more than one expression. In fact, it can be said that all participants used the right expressions about climate and weather events. Accordingly, it is seen that the majority of the participants stated that the climate "*covers a large area (83.33%)*" and "*long years (71.43%)".* In addition, it was observed that the majority of the participants stated that the weather events cover a "*narrow area (75.40%)"* and "*short years (59.52%)".* The citations for this theme are presented below.

Characteristics of climate
In this category, participants' statements about climate and weather events are presented as follows (Quotations are randomly selected):
Climate is seen in a wide area, in a long time. Climate reports certainty. Variability is low. It is indicated by terms such as dry, hot, cold and humid (P7).
The climate is long lasting, the variability is low. It is certain. It occurs in a large area (P24).
The climate is long-term and certain. It covers large areas. Climatic science is called climatology, a scientist who investigates climatology (P56).
The climate is long lasting. Occurs in large areas. It is certain. The climate scientist is called climatologist (P103).
Climate covers long years in large areas. It is final (P133).

As it is understood from the quotations above, each participant used at least one correct expression regarding the climate. Some used more than one, while others used a small number of expressions. Accordingly, it is understood that the participants stated that the climate was in a "*long time*", covering "*large areas*". They also stated that the climate is "*precise*" and expressed in terms of "*dry, hot, cold and humid*". Finally, it is understood that the participants stated that climatic science is called "*climatology*", and the scientist who is investigating it is called "*climatologist*". In general, it can be said that the participants state that the weather is average weather events covering a wide range of years.

Characteristics of weather events
In this category, the participants used quotations about weather events.
The area where it is formed is small, instant precipitation (P11).
Occurs in narrow areas. It's based on estimates. Per day. Sudden weather change (P35).
Short-term air movements in a narrow area (P54).
Occurs in a narrow area. Forecast is. Sunny etc. Used expressions. The discipline is called meteorology. The scientist is called a meteorologist. Occurs with sudden air changes (P63).
Weather events are short-lived. Weather events are seen in the narrow space. Weather events are predictions. Weather phenomena are called meteorologists (P105).
Weather events are short-term estimated values. Weather events can be made daily (P138).

As it is understood from the above quotations, it is understood that all of the participant's present information about "*weather events*" using one or more expressions. They stated that the participants had short-term events in a "*narrow*" area. It is also stated that weather events are "*estimated*" values and they are "*variable*". Finally, it is understood that weather events are called "*meteorology*" and scientists are called "*meteorologists*". In general, it can be said that the participants expressed the weather events as short-lived daily events in a narrow region.

DISCUSSION

According to the average scores of the academic achievement test and the criteria in Table 1, it can be said that the students' achievements in the seasons and climate units are at a good level. The fully structured interview form is based on descriptive and content analysis; It was determined that the majority of the students stated that the seasons occurred because of the Earth's rotation around the Sun and the tilting axis of the Earth. Although there are very few, it can be said that some students have incomplete or inaccurate knowledge about the seasons. It can be said that the students have average weather events covering the long-term and wide regions of the climate and that they express the weather events as short-lived daily events in a narrow region. In general, it can be said that the vast majority of students have the right knowledge about the seasons and climate unit.

It was determined that the students' level of success in the seasons and climate unit was good and the majority of the students had the right knowledge. This finding is an indicator of the students' academic achievement. In addition, questions such as formation of seasons, climate and weather events to be done correctly good level, which is generally measured in the academic achievement test, corresponds to the students' knowledge of Earth's rotation around the Sun and seasonal formation due to the tilting axis of the Earth, the average weather events of the climate, covering many years and covering large areas, weather events are short-lived daily events in a narrow region measured in a fully structured interview form. The concordance of these indicators indicates that the purpose of the research is realized and the problems are solved. These results are important because seasons and climate is a common problem in daily life. It can be thought that the academic success of the students in this subject originates from daily life. As a result, it can be said that the students have a sufficient level of knowledge in the seasons and climate unit which are closely related to daily life and this information is shown in the academic achievement test. Similarly, in the experimental studies of Balım (2009) and Coştu, Ünal & Ayas (2007), it was determined that the lessons learned for the use of science subjects in daily life increased student achievement. The findings of these studies are similar to the findings of the study. In addition, Turk and Kalkan (2017) have determined that students can learn subjects like seasons well by using physical modeling in their studies. In addition to these studies, Pinson (2001, transfer by Gülüm, 2009) found that students stated that weather events are caused by climate. In addition, Erkoca Akköse (2008), using creative drama technique in his study, has determined that students help to understand natural events by establishing cause and effect relationship. In addition to the above studies, Doğar & Başıbüyük (2005) found that students did not understand the climate and weather events sufficiently and had some misconceptions. In addition, Turk, Alemdar & Kalkan (2012) in students, Trumper (2006) in pre-service teachers found that there are many misconceptions about.

CONCLUSIONS AND RECOMMENDATIONS

It was found that the students' academic achievements in seasons and climate units were at a good level. The evaluation of the academic achievement test, which is applied only as a final test, can be evaluated according to the criteria determined according to the percentage note system.

The majority of the students stated that the seasons occurred because of the Earth's rotation around the Sun and the tilting axis of the Earth. The students mentioned the climate as the average weather events, covering large areas and covering many years. Also they stated that weather events are daily in short periods in a narrow region. In general, it was determined that the majority of the students

had the right knowledge about the seasons and the climate unit. It is thought that in the learning of the seasons and climate unit, higher successes will be achieved by using problems of daily life and using case studies.

As a result, it is determined that the knowledge of students about seasons and climate unit provides a good level of academic achievement. It was determined that the correct expressions of students about seasons, climate and weather events were indicators of academic achievement. In determining the indicators of the academic achievement obtained by the quantitative measurement tool, qualitative measurement tools can be used to control the reality level of this success and to determine the information on which this success is based.

Compliance with Ethical Standards

Funding
This study was not funded.

Ethical approval
All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent
Informed consent was obtained from all individual participants included in the study.

REFERENCES

Arık, S., & Yılmaz, M. (2017). Attitudes of science teachers towards environmental problems and their metaphorical perceptions for environmental pollution. *Kastamonu Education Journal, 25*(3), 1147-1164.

Bahar, M., Yener, D., Yılmaz M. & Emen, H., Gürer, F. (2018). The changes of standards in the 2018 science curriculum and stem integration. *Abant İzzet Baysal University Journal of Education Faculty,18* (2), 702-735.

Bakırcı, H. ve Kutlu, E. (2018). To determine the opinions of science teachers about the STEM approach*. Turkish Journal of Computer and Mathematics Education, 9*(2), 367-389.

Balım, A., G. (2009). The effects of discovery learning on students' success and inquiry learning skills. *Eurasian Journal of Educational Research, 35*, 1-20.

Birkenholtz, T. (2011). Network political ecology: Method and theory in climate change vulnerability and adaptation research. *Progress in Human Geography, 36*(3), 295-315, https://doi.org/10.1177/0309132511421532

Brando, P. M., Goetz, S. J., Baccini, A., Nepstad, D. C., Pieter S. A. Beck, P. S. A., & Christman, M. C. (2010). Seasonal and inter annual variability of climate and vegetation indices across the Amazon. *National Academy of Sciences, 107*(33), 14685-14690.

Büyüköztürk, Ş. (2009). *Manual of data analysis for social sciences*. Ankara: Pegem Academy.

Coştu, B., Ünal, S., & Ayas, A. (2007). The use of daily-life events in science teaching. *Ahi Evran University Kırşehir Education Faculty Journal, 8*(1), 197-207.

Creswell, J.W. (2013). *Qualitative research methods (Trans. Ed.: Whole, M., & Demir, S.B.).* Ankara: Political Publications Distribution.

Çepni, S., (2010). *Introduction to research and project work*. Trabzon: Celepler Printing.

Demir, İ., Kılıç, G., & Coşkun, M. (2008). Application of regional climate model PRECIS over Turkey and its neighborhood. *Climate Change and Environment, 1*,11-17.

Demirkuş, N. (2019). *Learning teaching theories and approaches*. http://www.biyolojiegitim.yyu.edu.tr/ders/omk.html Accessed on: 20.01.2019.

DeBoer, G. E. (2000). Scientific literacy: Another look at its historical and contemporary meanings and its relationship to science education reform. *Journal of Research in Science Education, 37*(6), 582-601.https://doi.org/10.1002/1098-2736

Doğar, Ç., & Başıbüyük, A. (2005).The understanding levels on weather and climate concepts for primary and secondary students. *Kastamonu Education Journal, 13*(2), 347-358.

Erkoca Akköse, E. (2008). The effectiveness of creative drama in determining the cause and effect of nature events in science activities in preschool education. *Creative Drama Journal*, 3(6), 1-17.

Garreaud, R. D. (2009). The Andes climate and weather. *Advances in Geosciences, 22*, 3-11, https://doi.org/10.5194/adgeo

Gedik, N., Altıntaş, E., & Kaya, H. (2011). Students views homework in the science and technology courses. *Journal of European Education, 1*(1), 6-13.

Glesne, C. (2013). *Introduction to qualitative research (Trans. Ed .: Ersoy, A., & Yalcinoglu, P.).* Ankara: Anı Publishing.

Gülen, S. (2018). Determination of the effect of the planetarium activities on the students. *European Journal of Education Studies, 5* (2), 48-64. doi: 10.5281 / zenodo.1413701

Gülen, S., & Demirkuş, N. (2014a). *Effect of visual material on student success*. Saarbrücken: Scholars Books Turkey.

Gülen, S., & Demirkuş, N., (2014b). The effect of visual material on student success in the solar system and beyond: space jigsaw unit. *Yüzüncü Yıl University Faculty of Education Journal, 11* (1), 1-19.

Gülüm, K. (2009). A study on learning levels of geography concepts and misconnect in the 5th grade students. *e-Journal of New World Sciences Academy, 4*(3), 1067-1079.

Kandemir, M. A. (2015). Examining reflective thinking tendency levels of primary school mathematics and classroom teacher candidates according to some variables. *Education Sciences, 10* (4), 253-275.

Lemke, J. L. (2001). Articulating Communities: Sociocultural Perspectives on Science Education. *Journal of Research in Science Teaching,* 38(3), 296-316.

Merriam, S. B. (2013). *A guide for qualitative research design and implementation (Trans. Ed .: Turan, S.).* Ankara: Nobel Publishing.

Miles, B. M., & Huberman, A. M. (1994). *Qualitative data analysis (2nd ed.*). London: Sage Publication. Ministry of National Education (MoNE), (2018). *Elementary and Secondary School 3, 4, 5, 6, 7 and 8 grades science curriculum*. Ankara: MoNE publications

Pinson R., (2001), *Misconceptions Research: Weather by Ruth Pinson* 3/29/01 (www.esu.edu/sps/Dean/miscon-weather.htm).

Riehl, H. (1979). *Climate and weather in the tropics.* London: Academic Press.

Tan, M, Temiz, A. (2003). The role and importance of scientific process skills in science teaching. *Pamukkale University Faculty of Education Journal, 13* (13), 89-101.

Trumper, R. (2006). Teaching future teachers basic astronomy concepts Sun-Earth-Moon relative movements at a time of reform in science education. *Research in Science &Technological Education, 24* (1), 85-109.

Türk, C., & Kalkan, H. (2017). Student opinions on teaching astronomy with hands-on models. *International Journal of Human Sciences, 14*(4), 3853-3865. doi:10.14687/jhs.v14i4.4990

Türk, C., Alemdar, M., & Kalkan, H. (2012). Determination of the level of understanding of seasons subject of elementary students. *Journal of Educational and Instructional Studies in The World, 2*(1), 62-67.

Türkeş, M. (2001). *Weather, climate, severe weather events and global warming*. General Directorate of State Meteorology Works 2000 Seminars, Technical Presentations, Seminar Series: 1: 187-205, Ankara.

Wang, B., & An, S. (2005). A method for detecting season□dependent modes of climate variability: S□EOF analysis. *Geophysical Research Letters, 32*(15), 1-4, doi:10.1029/2005GL022709

Yağbasan, R., & Gülçiçek, A. (2003). The characteristics of the concept misconnections in science teaching. *Pamukkale University Faculty of Education Journal, 13* (13), 102-120.

Yıldırım, A. & Şimşek, H. (2013). *Qualitative research methods in the social sciences.* Ankara: Seçkin Publishing.