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The Impact of Augmented Reality Applications on the Primary School 2nd Grade Students' Idioms Learning Levels

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Abstract. This study investigated the impact of augmented reality applications on improving the idioms learning levels of primary school 2nd grade students. The participants of the study were 29 students in the experimental and control groups studying in the second grade of a primary school in Eskişehir. In the experimental group, the idioms were taught with augmented reality applications. The experimental group implementation lasted for two weeks, and ten idioms that were mentioned in the 2nd grade Turkish course book under the theme of "Health, Sports and Play" were examined respectively. Data collection tools such as; "Idioms-Matching Form", "Idioms-Filling the Blank Form", "Idioms-Sentence Forming Form" developed by the researchers were used in the study. In the study, static group pre-test-post-test design, which is one of the pre-experimental designs, was used. The data obtained were analyzed with the statistical package program and it was found that there was a statistically significant difference between the groups in favor of the experimental group. In addition, the responses given to the Idioms-Sentence Forming Form were evaluated by content analysis method in order to demonstrate the change in the students' learning levels of idioms and support the research result. Based on these findings, it can be said that augmented reality applications are effective in improving the idioms learning levels of primary school 2nd grade students. The impact of augmented reality applications on other components of the vocabulary can also be determined.

Keywords. Primary school, teaching Turkish, vocabulary, idioms, augmented reality.

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It is important to develop vocabulary for effective communication and to provide opportunities for children. One of the critical periods in which these opportunities will be presented is the primary school period. Vocabulary is all of the words in a language, but it can also be named as lexicon, word-stock, word-hoard, storehouse of words, and treasury of words (Türk Dil Kurumu [TDK], 2016). Vocabulary, which is a requirement for speaking and writing a language (Calp, 2010), is also related to understanding what one reads and listens. Aksan (2002, 13) defines the vocabulary as "a concept composed of words, reduplications, proverbs, related words, idioms and formulaic words". Children start using the language proficiently between the ages of 5-10 and can learn the subtleties of the language (Yapıcı, 2004). It is important for primary school students to enrich their vocabulary in the development of their language skills. The acquisition of the four basic language skills of reading, writing, speaking and listening and the ability of the individual to effectively use these skills are closely related to the acquired rich vocabulary (Karatay, 2007). Students' thorough and accurate understanding of what they read or listen to and expressing what he/she understands, thinks and designs effectively in words and writing depends on the richness of the vocabulary (Sever, 2000). Ministry of National Education [MoNE] (2017) Turkish Language Curriculum aims to help students reach language pleasure and consciousness by enriching their vocabulary based on what they read, listen to/watch. In addition to this, it is also aimed at developing their feelings, thoughts and imaginations.

It can be said that there is a close relationship between the development of four basic language skills and vocabulary. It allows students to interpret words accurately and to understand what they read and listen to. Individuals with rich vocabulary use their speaking and writing skills more effectively (Pehlivan, 2003). At this point, it is necessary to focus on the ways in which students' vocabulary will be enriched. There are many different approaches and techniques used in vocabulary teaching. One of the reasons for this is that teachers' experience and knowledge are very different from each other (Karadüz & Yıldırım, 2011). According to the Primary and Secondary School Turkish Lesson Curriculum, in the development of vocabulary, dictionary, picture dictionary, word cards and word maps can be used. Acquisitions about idioms, which are an element of vocabulary, start in the 3rd grade (MoNE, 2017). In this respect, one of the subjects that should be highlighted in order to enrich the vocabulary is the teaching of idioms. Because primary school children are exposed to idioms in some way in their daily lives.

Idiom is defined in the dictionary as "a formulaic phrase, or word with a specific meaning, more or less different from its real meaning" (TDK, 2017). Idioms are used to communicate a situation or concept as interesting in a special pattern. Idioms do not declare rules or judgments (Çakıcıoğlu, 2014). Using an idiom makes expression more effective by strengthening its meaning as well as its appeal. Given the relationship between idioms and vocabulary, it can be said that idioms are a sub-dimension of vocabulary. Idioms in a language are also included in the vocabulary; they are important elements that reveal the power and success of the language-speaking society, its tendency towards analogy and wit (Aksan, 2004). Idioms, like proverbs, are formulaic words. The syntax of an idiom cannot be spoiled, and the words of an idiom cannot be changed and replaced with other words, even if the meaning remains the same (Aksoy, 1993). In Turkish, situations and events that are difficult to explain and that can be considered as detail are explained with very subtle analogies through idioms. This is called "concretization" of the meaning (Aksan, 2004). As the child begins to interact with language, the child encounters idioms. Although MoNE (2017) does not include the achievements of idioms and proverbs at the 2nd grade level in the Turkish Lesson Curriculum it has published, idioms are used in order to strengthen the meaning in the texts in the 2nd Grade Turkish Textbook (2016). In transferring the values of the society, the child lives in, proverbs and idioms are crucial for individuals to express themselves effectively in the socialization process. These are the most important indicators of the depiction of an identity, a photograph, a lifestyle, a society. Proverbs and idioms that emerge as a result of a certain life experience in societies takes an important place in education with their didactic features (Aksoy, 1981). Therefore, teaching idioms emerges as an issue that should not be neglected in the acquisition of vocabulary.

The idioms dealt with in the study are in the theme of Health, Sports and Play in the primary school 2nd grade Turkish Textbook (2016); "to be sick of something", "not to care", "to be an heirloom", "to bend one's neck", "to give shape to something", "to barge in", "to tidy up", "to go silent", "to go out of sight" and "be like a pearl" (MoNE, 2016, 74-84). These idioms strengthen the expression in the texts. The use of idioms in the texts enabled the students to have preliminary knowledge about idioms. Idioms, both analogically and metaphorically, were introduced to students through texts. Idioms are one of the important elements of culture that deepens the meaning of writing and makes it more sincere. Since idioms are used many times in daily life, children encounter idioms from the moment they are born. Children are taught in primary school the meaning of the idioms they are exposed to in both listening and reading activities. Many methods, techniques and tools can be used in teaching idioms. One of them is the augmented reality [AR] application.

AR applications can be effective and functional in making learning permanent. AR makes learning more permanent by combining real and virtual environments simultaneously (Azuma, 1997) and integrates the materials prepared with the applications in the virtual and real-world context. AR are environments where real and virtual worlds come together in the same sensory area in real time and reach the user (Özarslan, 2011). From this point of view, it can be said that AR creates real-time learning environments by employing more than one sense and makes learning permanent. AR is the reflection of any object, shape or picture displayed on mobile devices or computers, as if they were real, on the screen by converting them to specific images. In short, thanks to this system, an object or an event that is not there in real life seems to occur through the screen of the computer or mobile device in the palm of the hand (Çakır, Solak, & Tan, 2015). Azuma (1997) divided AR into two as optical and video-based, considering the technological possibilities. The main difference that separates optical and video-based reality technologies from each other is the place where the image is seen as a result of the integration of the real and virtual world. The integrated scene in optical systems is seen in the real world through glasses, while the integrated scene in video-based systems is seen on the PC/tablet/mobile device (Somyürek, 2014). Video-based augmented reality application was used in this research.

In the experimental group of the study conducted, the videos prepared about the idioms were reflected on the screen through the visuals in which the idioms were written and the AR application. Virtual learning objects and textbooks can be used together, thanks to its feature of providing multimedia content by adding a digital layer to real world images simultaneously with AR (İbili & Şahin, 2015). Sensory, interactive, and well-designed multimedia with network-developed multimedia materials enable students to participate in the learning process actively and to learn permanently (Küçük, Yılmaz, & Göktaş, 2014). The MoNE has made textbooks interactive and included the 2-d codes that enable the textbooks to be able to access content that reinforces the subject as of 2017-2018 academic year. From this point of view, it can be predicted that the rate of use of AR technology in educational environments will increase in order to ensure permanent and effective learning. Some of the studies in the literature state that the similarity of the material used in the learning process with real life creates effective and productive learning situations (Klopfer & Squire, 2008). Using augmented reality applications can ensure the effectiveness and permanence of education in situations where living, experiencing and learning is difficult. It can also make learning more enjoyable by providing motivation for learning.

There are application examples of AR applications that include pre-school (Çevik et al., 2017), primary school (Onbaşılı, 2018), secondary education and undergraduate education levels (Di Serio, Ibáñez, & Kloos, 2013; Akkuş, 2016). It has been demonstrated by scientific research that AR applications have a positive impact on cognitive, social and affective development and make the learning environment realistic (Yılmaz & Batdı, 2016); makes learning interesting (Hwang et al., 2016); concretizes the learning of concepts, events and objects (Wu et al., 2013); makes the lesson enjoyable and ensures active participation (Yılmaz & Batdı, 2016; Bacca et al., 2014); positively affects students' motivation and attitudes towards the course (Singhal et al., 2012); it is effective in teaching dangerous situations that are difficult to observe (Abdüsselam, 2014); provides learning by doing (Dunleavy & Dede, 2014); supports informal learning (Huang, Chan, & Chou, 2016). Since idioms are elements of vocabulary that are more or less far removed from the real meaning, they need to be concretized in order for students to learn idioms. For this purpose, AR technology is thought to be one of the best ways to concretize the teaching of idioms. The purpose of the study is to examine the impact of augmented reality applications on improving the idioms learning levels of primary school 2nd grade students.

Limitations

This research has the following limitations:

1. Research findings are limited to the data obtained from the 2nd grade students of a private primary school in Eskişehir in the 2017-2018 academic year,

2. The idioms found in the theme of "Health, Sports and Play" in the 2nd Grade Turkish Textbook of the Ministry of National Education (2016).

Assumptions

The following assumptions are made in this research:

1. It is assumed that uncontrollable variables in the experimental and control groups affected both groups similarly,

2. The level of readiness for the "Health, Sports and Play" theme of the students in the experimental and control groups is equal.

Methodology

Research Model

In this study, pre-experimental static group pre-test post-test design was used. In this design, also known as the pre-test post-test non-equivalent group design, ready groups are used. There is no random assignment or matching of subjects to groups. One of the groups is determined as the experimental (E) group and the other as the control (C) group. The usability of the design increases as it allows knowing the starting points of the groups regarding the measured quality, the measurement and testing of the change (Büyüköztürk et al, 2016). The symbolic view of this pattern is given in Table 1.

Table 1.

Static Group Pretest-Posttest Design

Group	Pre-test	Process	Post-test
E	O1	X	S1
C	O2		S2

The starting point of this research is the researchers' observations and inferences during his teaching experience and the opinions of his colleagues. In addition to the activities of the Primary and Secondary School 1st, 2nd, 3rd, 4th, 5th, 6th, 7th and 8th Grade Turkish Language Curriculum (2017), it was aimed to determine whether a technology-based activity is effective or not. In addition, the fact that the researcher (first author) was the classroom teacher of the experimental group provided a suitable environment for the implementation. For this purpose, the research design was chosen as a static group pretest-posttest design.

Study Group

The study group of the research consists of 29 students studying in the second grade of a private primary school in Eskişehir. There are 15 students in the experimental group and 14 students in the control group. Convenient sampling method was used because the researcher is a teacher, every student in the school has a tablet and support staff available for downloading the AR application to be used on student tablets. Necessary permissions were obtained to carry out the study and to implement the data collection tools at the designated school. Convenient sampling aims to prevent time, money and labor loss (Büyüköztürk et al., 2016). Table 2 shows the information about the parents' education and family income and the number of computers/tablets at home for 9 girls, 6 boys in the experimental group, and 7 girls and 8 boys in the control group.

Table 2.

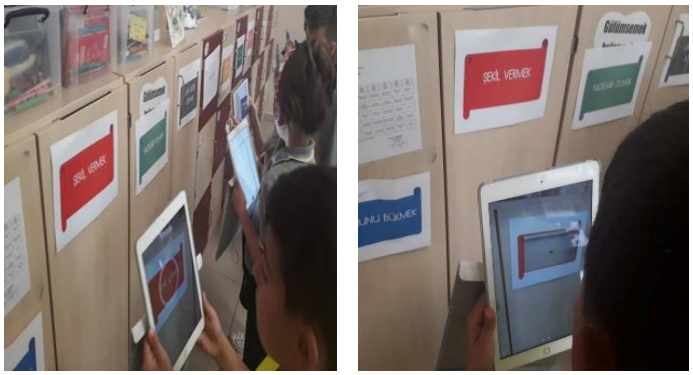
Information on the Parents' Education, Income and Number of Computers/Tablets at Home of the Study Group

		Experimental Group		**Control Group**	
		f	**%**	**f**	**%**
Mother's Education	High school	5	33.3	1	7.1
	Undergraduate education	7	46.7	9	64.3
	Postgraduate education	3	20.0	4	28.6
	Total	**15**	**100.0**	**14**	**100.0**
Father's Education	High school	1	6.7	-	-
	Undergraduate education	14	93.3	5	35.7
	Postgraduate education	-	-	9	64.3
	Total	**15**	**100.0**	**14**	**100.0**
Family Income (1 dollar 6000 TL)	Between 5001-10.000 TL	7	46.7	3	21.4
	More than 10.001	8	53.3	11	78.6
	Total	**15**	**100.0**	**14**	**100.0**
Number of Computers/Tablets at Home	1	4	26.7	4	28.6
	2	7	46.7	8	57.1
	3	3	20.0	1	7.1
	4	1	6.7	1	7.1
	Total	**15**	**100.0**	**14**	**100.0**

Table 2 shows that while 33.3% of mothers of experimental group students had high school diplomas, 46.7% had undergraduate degrees, and 20% had postgraduate degrees, only 7.1% of mothers of control group students had high school diplomas, 64.3% had undergraduate degrees, and 28.6% had postgraduate degrees. While 6.7% of the fathers of the students in the experimental group were high school graduates, 93.3% had undergraduate degree; 35.7% of the fathers of the control group students had undergraduate degree and 64.3% had graduate degree. According to this, it is seen that the educational status of the parents of the control group is higher than that of the experimental group. While the income of 46.7% of the families of the experimental group students was between 5,000-10,000, 53.3% of them were higher than 10,001; the income of 21.4% of the families of the control group students is between 5.000-10.000, the income of 78.6% of them is higher than 10,001. It can be said that the economic status of the families of the control group students is higher than that of the experimental group. When the number of computers/tablets at home was considered, 26.4% of the students in the experimental group have 1 computer/tablet, 46.7% have 2, 20% have 3 and 6.7% have 4 computers/tablets; 28.6% of those in the control group have 1 computer/tablet, 57.1% have 2 computers, 7.1% have 3 computers and 7.1% have 4 computers/tablets. With this regard, it can be said that there are more computers/tablets in the house of the experiment group students than the control group.

Experimental Process

The pre-test was administered on 14 May 2018. The first author is the practitioner of the experimental group. Permission to practice was also obtained from the classroom teacher of the control group. According to the idioms determined, the students prepared dialogues in accordance with the idiom they were assigned. The students then recreated these dialogues with finger puppets and recorded the video of these animations. The animations are planned in order to present the meaning of the idiom correctly and to use it in AR application. The animations were performed with groups of only 2 or 3 people and were recorded. Animation and video recordings were made in order for the students to access the appropriate use of the idioms by using the AR application. The image recordings were embedded in the images prepared by the first author with the AR application, in which the idioms were written. After each animation, images were posted in the classroom and the students used these images to access the embedded video with in the image in all their free time through the AR application. In this process, they both used technology and had the opportunity to see the use of idioms in an interesting way over and over again. The application ended with the application of the post-test on June 2, 2018. Visuals related to the implementation process are given in Picture 1.



Picture 1. Examples from the Experimental Group Implementation Process.

In Picture 1, students first access the video recordings containing the determined idioms through the AR application on their tablets. Then, the AR application displays the image on which the idiom is written on the tablet screen. Finally, it provides access to the recording of the relevant image. The students used finger puppets while shooting the animations embedded in the posted image through AR application. The embedding of the image records into the image with the AR application was carried out by the first author.

Data Collection Tools

For the idioms in the theme of "Health, Sports and Play" in the primary school 2nd grade Turkish lesson, 4 forms were developed in order to determine the level at which the students can achieve the goals identified. Expert opinion was sought for the content validity of the Idioms-Matching, Idioms-Filling the Gap and Idioms-Sentence Forming forms developed by the researchers. The forms were used as a pre-test before the implementation and as a post-test at the end of the implementation. Students answered the forms in an integrated manner, one after the other. In each form, there is a question related to each idiom determined. In addition, the Parent Information Form was also used. Explanations on these forms are given below.

Idioms-Matching Form. In this form, the specified idioms and the meanings of these idioms are given in a mixed form. The student was expected to find and match the meaning of each idiom. The form was scored as 1 for each correct match and 0 for blank or incorrect matching. Students can get a minimum of 0 and a maximum of 10 points from the form.

Idioms-fill-in-the-blank form. In the paragraphs created in this form, spaces are given where the idioms can be placed in accordance with their meaning. It is expected that the appropriate one of the given idioms should be placed in the blank space in each of the paragraphs. The form was scored as 1 for each correct match and 0 for blank or incorrect matching. Students can get a minimum of 0 and a maximum of 10 points from the form.

Idioms-sentence forming form. In this form, students were expected to construct a meaningful sentence for each of the given idioms. Students got 1 point if sentences suitable for the meaning of the idiom were formed, and 0 points if sentences were not made in accordance with the meaning of the idiom or left blank. Students can get a minimum of 0 and a maximum of 10 points from the form. In addition, the data obtained from this form were evaluated through content analysis.

Parent information form. With this form, information about the purpose of introducing the study group was collected from the parents. Information on the education of the students' parents, the economic status of the family, and the number of computers/tablets at home were collected.

Data Analysis

The data obtained from the forms applied as pre-test and post-test were transferred to the computer. There are 10 questions in the forms. Each correct question is given 1 point. Evaluations were made out of 10 points. In the forms, there are questions about both the semantics of idioms and their proper use in sentences. It was aimed to reveal the development in the students' learning levels

of idioms by conducting content analysis on the answers given to the open-ended questions in the Idioms-Sentence Forming Form of the experimental group. After obtaining the pre-test and post-test scores of the experimental and control groups, the average scores of the groups and other descriptive statistics were calculated. Normality analysis was performed to determine if the obtained data were normally distributed. Since the group size was less than 50, normality analysis was performed with the Shapiro-Wilk Normality Test. Büyüköztürk (2017) stated that if the calculated p-value is less than $p<.05$, the scores will be interpreted as showing a significant (extreme) deviation from the normal distribution, and in this case, statistics that require the "normality" assumption should not be used. The Normality analysis tables and results are given in Table 3.

Table 3.

Shapiro-Wilk Normality Test Analysis Results of the Experimental Group Data

	Shapiro-Wilk		
	Statistic	**df**	**Sig.**
Pre-test	.891	15	.070
Post-test	.906	15	.117

According to the Shapiro-Wilk Normality Test analysis results of the data obtained from the experimental group in Table 3, statistics that require the assumption of normality should be used in the statistics to be used regarding the pre-test and post-test scores ($p>.05$). In Table 4, the Shapiro-Wilk Normality Test analysis results of the data obtained from the control group are given.

Table 4.

Shapiro-Wilk Normality Test Analysis Results of Control Group Data

	Shapiro-Wilk		
	Statistic	**df**	**Sig.**
Pre-test	.971	14	.894
Post-test	.878	14	.055

According to Table 4, statistics that require the assumption of normality should be used in the statistics to be used regarding the pre-test and post-test scores ($p>.05$). For this reason, the Two-Factor ANOVA Test for Mixed Measures, one of the parametric tests, was used. The coding and statistical analyzes of the collected data were made with the statistical package program.

Findings

Findings and Comments on Pre-test and Post-test Results of Experimental and Control Groups

In the study, the answer to the question: "Do the pre-test and post-test results of the experimental and control groups differ?" has been sought. The pre-test scores of the students in the experimental group from the Idioms-Matching Form, Idioms-Filling the Blank Form and Idioms-Sentence Forming

Form are shown in Table 5. The names in the tables are not the real names of the students. Students were given code names.

Table 5.

Number of True, False and Blank Answers Given by Experimental Group Students in the Pre-test

	Idioms-Matching Form			**Idioms-Filling the Blank Form**			**Idioms-Sentence Forming Form**		
Students	True	False	Blank	True	False	Blank	True	False	Blank
Ayşe	5	1	4	7	3	0	3	5	2
Sevgi	10	0	0	6	3	1	6	4	0
Fatma	5	4	1	1	8	1	3	7	0
Melek	9	1	0	9	0	1	8	2	0
Ayten	2	0	8	3	2	5	2	1	7
Gül	2	0	8	3	7	0	3	1	6
Ahmet	3	0	7	3	1	6	5	0	0
Mehmet	5	0	5	4	0	6	3	1	6
Aysun	1	1	8	1	1	8	3	0	7
Veli	1	1	8	2	8	0	3	7	0
Cihan	5	2	3	6	3	1	3	1	6
Selim	3	2	5	5	5	0	3	6	1
Nuray	7	3	0	7	2	1	0	1	9
Emre	5	1	4	2	0	8	4	4	2
Merve	5	3	2	4	6	0	3	1	6

As can be seen in Table 5, Sevgi got full points and Melek got 9 points in the pre-test Idioms-Matching Form, respectively, received the highest scores. Aysun and Veli got the lowest scores with 1 point. In the Idioms-Filling the Gap Form, the highest scores were achieved by Melek with 9 points, Ayşe and Nuray with 7 points. The lowest scores belong to Fatma and Aysun with 1 point. In the Idioms-Sentence Forming Form, the highest scores were received by Melek with 8 points and Sevgi with 6 points. The lowest scores belong to Nuray, who did not get points, and Ayten, who got 2 points.

The post-test scores of the experimental group students from the Idioms-Matching Form, Idioms-Filling the Gap Form and Idioms-Sentence Forming Form are given in Table 6.

Table *6.*

Number of True, False and Blank Answers Given by Experimental Group Students in the Post-Test

	Idioms-Matching Form			**Idioms-Filling the Blank Form**			**Idioms-Sentence Forming Form**		
Students	True	False	Blank	True	False	Blank	True	False	Blank
Ayşe	10	0	0	10	0	0	7	3	0
Sevgi	8	1	1	10	0	0	10	0	0
Fatma	10	0	0	5	0	5	6	4	0
Melek	10	0	0	10	0	0	10	0	0
Ayten	8	1	1	9	1	0	10	0	0
Gül	8	2	0	10	0	0	6	1	3
Ahmet	10	0	0	10	0	0	9	1	0
Mehmet	8	1	1	10	0	0	8	2	0
Aysun	10	0	0	10	0	0	9	1	0

Veli	10	0	0	10	0	0	9	1	0
Cihan	8	2	0	10	0	0	9	1	0
Selim	8	1	1	3	7	0	10	0	0
Nuray	10	0	0	10	0	0	10	0	0
Emre	7	0	3	9	1	0	9	1	0
Merve	8	2	0	10	0	0	7	3	0

According to Table 6, Ayşe, Fatma, Melek, Ahmet, Aysun, Veli and Nuray got the highest scores in the post-test Idioms-Matching Form. Emre got the lowest score with 7 points. Ayşe, Sevgi, Melek, Gül, Ahmet, Mehmet, Aysun, Veli, Cihan, Nuray and Merve got the highest scores in the Idioms-Filling the Gap Form. The lowest scores were received by Selim with 3 points and Fatma with 5 points. In the Idioms-Sentence Forming Form, the highest scores were obtained by Sevgi, Melek, Ayten, Selim and Nuray by getting full points. The lowest scores were received by Gül with 6 points and Ayşe with 7 points.

The pre-test scores obtained by the control group students from the Idioms-Matching Form, Idioms-Filling-the-Blank Form and the Idioms-Sentence Forming Form are given in Table 7.

Table 7.

Number of True, False and Blank Answers Given by the Control Group Students in the Pre-test

	Idioms-Matching Form			**Idioms-Filling the Blank Form**			**Idioms-Sentence Forming Form**		
Students	True	False	Blank	True	False	Blank	True	False	Blank
Sema	5	5	0	9	1	0	6	4	0
Yusuf	5	5	0	5	0	5	4	6	0
Serap	4	6	0	4	2	4	3	5	2
Veli	5	4	1	3	7	0	3	3	4
Ceren	1	6	3	3	7	0	4	5	1
Damla	5	5	0	5	0	5	6	3	1
Selin	7	3	0	5	0	5	5	4	1
Hacer	10	0	0	6	0	4	6	2	2
Ali	7	0	3	7	0	3	4	2	4
Hasan	7	1	2	7	1	2	2	4	4
Alper	5	0	5	4	2	4	6	0	4
Esra	8	2	0	7	1	2	10	0	0
Yiğit	6	1	3	3	0	7	2	0	0
Cemil	4	4	2	6	1	3	4	3	3

According to Table 7, Hacer achieved the highest scores in the pre-test Idioms-Matching Form with full points and Esra with 8 points. Ceren got the lowest score with 1 point. Sema with 9 points and Ali and Hasan with 7 points got the highest scores in the Idioms-Filling the Gap Form. Veli, Ceren and Yiğit got the lowest scores with 3 points. Esra achieved the highest score in the Idioms-Sentence Formation Form with a full score. Hasan and Yiğit got the lowest scores with 2 points.

The post-test scores of the students in the control group from the Idioms-Matching Form, Idioms-Filling-the-Blank Form and Idioms-Sentence Forming Form are given in Table 8.

Table 8.

Number of True, False and Blank Answers Given by Control Group Students in the Post-test

	Idioms-Matching Form			**Idioms-Filling the Blank Form**			**Idioms-Sentence Forming Form**		
Students	True	False	Blank	True	False	Blank	True	False	Blank
Sema	8	2	0	8	2	0	7	2	1
Yusuf	5	2	3	5	0	5	5	0	5
Serap	4	6	0	4	0	6	4	3	3
Veli	5	3	2	4	6	0	4	5	1
Ceren	5	4	1	3	4	3	4	4	2
Damla	3	7	0	10	0	0	3	0	7
Selin	5	5	0	6	0	4	6	3	1
Hacer	10	0	0	10	0	0	8	2	0
Ali	7	0	3	8	0	2	3	5	2
Hasan	7	0	3	9	1	0	7	1	2
Alper	6	0	4	4	2	4	3	2	5
Esra	7	2	1	10	0	0	10	0	0
Yiğit	4	4	2	4	4	2	3	3	4
Cemil	6	3	1	5	1	4	3	3	4

According to Table 8, Hacer with full points and Sema got 8 points got the highest scores in the post-test Idioms-Matching Form. The lowest score belongs to Damla with 3 points and Yiğit with 4 points. Damla, Hacer and Esra achieved the highest scores in the Idioms-Filling the Gap Form with full points. The lowest scores were received by Ceren with 3 points and Serap, Veli, Alper and Yiğit with 4 points. Esra with a full score and Hacer with 8 points got the highest scores in the Idioms-Sentence Forming Form. The lowest scores belong to Damla, Ali, Alper, Yiğit and Cemil with 3 points.

The mean and standard deviation values of the pre-test and post-test scores of the experimental and control groups are given in Table 9.

Table 9.

Mean and Standard Deviation Values of Experimental and Control Groups' Pre-test and Post-test Scores

	Group	**$\bar{X}$**	**S**	**N**
Pre-test	Experimental Group	12,2000	5,67199	15
	Control Group	15,5714	4,66928	14
	Total	13,8276	5,39887	29
Post-test	Experimental Group	26,5333	2,89992	15
	Control Group	17,0714	5,92860	14
	Total	21,9655	6,60888	29

According to Table 9, the pre-experimental Idioms-Matching Form, Idioms-Filling-Blank Form and Idioms-Sentence Forming Form mean score of the experimental group in which idiom teaching was carried out with AR application was 12.20, while this value became 26.53 after the experiment. While the pre-experiment average score of the control group, which was taught idioms without using AR, was 15.57, this value was 17.07 in the post-test. Accordingly, it can be said that an increase was observed in the post-test scores of both groups. The change in the mean scores of the experimental and control groups from the pre-test to the post-test is given in Figure 1.

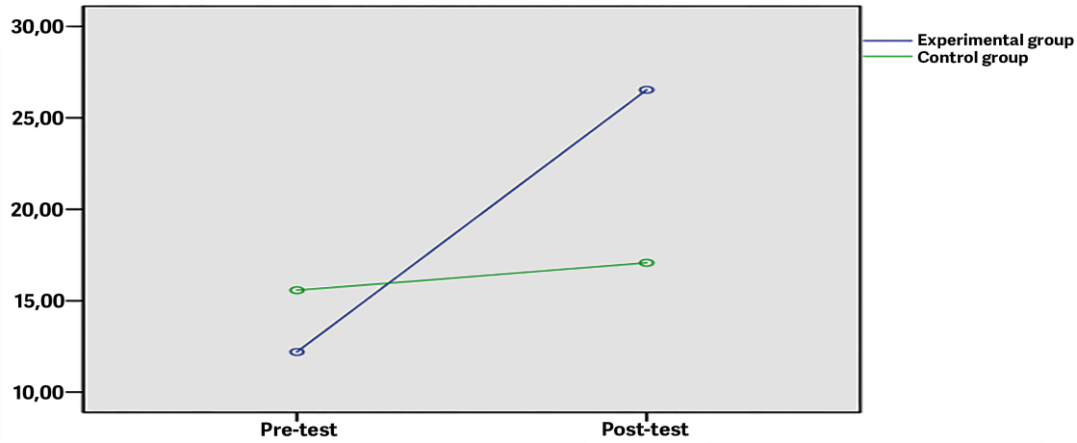


Figure 1. Pre-test and Post-test Average Scores of the Experimental and Control Groups.

According to Figure 1, the post-test scores of the experimental and control groups are higher than the pre-test scores. The two-factor ANOVA results of the experimental group students who were exposed to the experimental procedure and the control group students who were not subjected to the experimental procedure, regarding whether the changes observed after the experiment showed a significant difference compared to the pre-experimental process are given in Table 10.

Table 10.

ANOVA Results of Pretest-Posttest Scores of Experimental and Control Groups

Source of Variance	**KT**	**sd**	**KO**	**F**	**p**
Between subjects	1176.380	28			
Group (Individual/Group)	134.306	1	134.306	3.480	.073
Error	1042.074	27	38.595		
Within-subjects	1770.411	29			
Measure (Pre-test - Post-test)	907.687	1	907.687	91.990	.000
Group Measure	**596.307**	**1**	**596.307**	**60.433**	**.000**
Error	266.417	27	9.867		
Total	2946.791	57			

According to Table 10, it was found that the test scores of the experimental group in which idiom teaching was performed with AG applications showed a significant difference between before and after the experiment [$F_{(1,27)} = 60.433$, $p<.001$]. This significant difference is due to being in different implementation groups.

This finding shows that idiom teaching with AR applications has different impacts on increasing students' learning levels. In the scores obtained from Idioms-Matching Form, Idioms-Gap Filling Form and Idioms-Sentence Forming Form, it is understood that idiom teaching with AR applications, which reached a higher learning level than before the experiment, is more effective in increasing the learning levels of students compared to the teaching without AR applications. In this study, the results of the group and measurement main effect tests were not interpreted, since the focus of the research was only to test the effectiveness of two different groups in increasing the learning levels of different applications.

Findings and Comments Obtained from the Evaluation of the Idioms-Sentence Forming Form

Sentence building activities were created by researchers to determine whether the idiom being taught was fully learned by the students and used correctly. The evaluation of the Idioms-Sentence Forming Form is important in terms of demonstrating the change in the idioms learning levels of the experimental group students and supporting the research result. In this form, appropriate spaces were given under the determined 10 idiom and idioms, and students were expected to use the idioms in a sentence in accordance with their meaning.

As a result of the evaluation of the form, the scores of the students in the experimental group regarding 10 questions in the form were analyzed and evaluated. The frequency and percentage values of the answers given by the experimental group students to the first question in the Idioms-Sentence Forming Form in the pre-test and post-test are given in Table 11.

In the first question in the Idioms-Sentence Forming Form, the students were asked to use the idiom "to be sick of something" in a sentence, considering its meaning. When the answers given are examined, it is seen that the students generally gave correct answers as can be seen in Table 11. The frequent use of this idiom in daily life may have led to this result. In the pre-test, 13.3% of the students answer the question incorrectly. The incorrect answers were caused by the fact that the idiom was not used in the sentence, and students who answered incorrectly said, "Elif has a bad smell." They made explanations that reminded the meaning of the idiom.

When the answers from the pre-test to the post-test were compared, answers given in the pre-test such as, "I was very sick today." were prominent, while the majority of the answers in the post-test were in the form of using the garbage example "I was sick of the smell of the garbage ". Aysun's response to this question in the post-test, "I get very sick when you were eating with your mouth open." was the most striking and diversifying answer. The garbage sample was also used in the video recording that the students accessed through the AR application. From this point of view, it is seen that the AR application has a positive impact on the students' understanding of the meaning of the idiom, making sentences suitable for the meaning of the idiom, and therefore on the level of learning the idiom.

In the second question of the Idioms-Sentence Forming Form, students were asked to use the idiom "not to care" in a sentence, considering its meaning." As shown in Table 11, when the answers given are examined, the ratio of the correct answers has increased from 26.7% to 93.3%. The number of blank and false answers has noticeably reduced. This situation can be interpreted as the students' ideas about the meaning and usage of the idiom formed from the pre-test to the post-test. In addition to not using the idiom in a sentence, the incorrect answers were given as the removal of the negative suffix in the structure of the idiom as in the following sentence: "My friend has taken care of it today", "Ayşe, I will take care of you now." When the answers given in the pre-test test and post-test were compared, correct answers were given as in the example of:" I didn't care about my friend," he didn't care." Although these sentences are correct in terms of meaning and structure, they are the answers that the student knowledge of the idiom cannot be fully interpreted.

In the post-test, they used the phrase "don't care" together with a person or a behavior in a sentence. More qualified answers were given such as: "They made fun of me today, but I didn't care for them.", "I didn't care what he said." In the video recording that students accessed through the AR application, the example of not caring the word that contains sarcasm was used.

From this point of view, it can be interpreted that AR application has a positive impact on students' understanding of the meaning of the idiom, making more qualified sentences, and therefore on the level of learning the idiom.

Table 11.

Frequency and Percentage Values of the Experimental Group Students' Answers to the Questions in the Idioms-Sentence Forming Form in the Pre-test and Post-test

Idioms		**Answers**	**Pre-test**		**Post-test**	
			f	**%**	**f**	**%**
1.	Being sick of something	False	2	13.3	-	-
		True	13	86.7	15	100.0
		Total	15	100.0	15	100.0
2.	Not to care	False	4	26.7	14	93.3
		True	4	26.7	-	-
		Blank	7	46.7	1	6.7
		Total	15	100.0	15	100.0
3.	To be an heirloom	False	4	26.7	1	6.7
		True	2	13.3	14	93.3
		Blank	9	60.0	-	-
		Total	15	100.0	15	100.0
4.	Bend your neck	False	5	33.3	6	40.0
		True	3	20.0	9	60.0
		Blank	7	46.7	-	-
		Total	15	100.0	15	100.0
5.	Give shape to something	False	4	26.7	1	6.7
		True	4	26.7	14	93.3
		Blank	7	46.7	-	-
		Total	15	100.0	15	100.0
6.	Barge in	False	4	26.7	-	-
		True	7	46.7	15	100.0
		Blank	4	26.7	-	-
		Total	15	100.0	15	100.0
7.	Tidy up	False	4	26.7	2	13.3
		True	6	40.0	12	80.0
		Blank	5	33.3	1	6.7
		Total	15	100.0	15	100.0
8.	Go silent	False	7	46.7	4	26.7
		True	1	6.7	10	66.7
		Blank	7	46.7	1	6.7
		Total	15	100.0	15	100.0
9.	Go out of sight	False	4	26.7	3	20.0
		True	8	53.3	12	80.0
		Blank	3	20.0	-	-
		Total	15	100.0	15	100.0
10.	Like a pearl	False	3	20.0	1	6.7
		True	4	26.7	14	93.3
		Blank	8	53.3	-	-
		Total	15	100.0	15	100.0

In the third question in the Idioms-Sentence Forming Form, the students were asked to use the idiom "to be an heirloom" in a sentence, considering its meaning. As can be seen in Table 11, when the answers given are examined, the rate of the correct answers increased from 13.3% to 93.3%. The number of blank and false answers decreased significantly. This situation can be interpreted as the students' ideas about the meaning and usage of the idiom formed from the pre-test to the post-test. In

the pre-test, Sevgi and Selim said, "My grandmother said, 'This cardigan is an heirloom from me to you.'" and "I went to Portugal. The football player gave me his jersey and said, 'Let it be an heirloom to you.'" they gave the correct answers. The incorrect answers given in the pre-test include sentences that do not use the idiom and are not related to the idiom, as well as "Daddy, you are a very heirloom person." is given in the form of incorrect use. In the post-test, "This is a very nice memory, it was an heirloom from you to me.", "Let this buckle be your heirloom.", "Cem will move from here. I gave my ball to him as an heirloom." correct answers were given in accordance with the meaning and structure of the idiom. There was a significant increase in the number of correct answers in the post-test. From this point of view, it can be interpreted that AR application has a positive impact on students' understanding of the meaning of the idiom, making more qualified sentences, and therefore on the level of learning the idiom.

In the fourth question in the Idioms-Sentence Forming Form, the students were asked to use the idiom "bend one's neck" in a sentence, considering the meaning of it. When the answers given were examined, the rate of correct answers increased from 20% to 60%, as shown in Table 11. The number of blank and false answers decreased significantly. The fact that this idiom reminds a real bowing gesture to students may have made it difficult for them to understand its meaning compared to other idioms. In the pre-test, the answer Melek gave is noticeable in terms of the correct use of the meaning of the idiom: "No one played with her, her neck was bent." In the pre-test, wrong answers were given literally conjured up the bowing gesture, "I bent my neck a lot yesterday.", "Girl, don't bend your neck while looking at the tablet!". In the post-test, "I was in a very helpless situation, my neck was bent.", "This cat bent its neck because it was hungry.", "I couldn't solve the question at the end of the lesson, my neck was bent." answers were given showing painful, helpless situations. The incorrect answers, on the other hand, were given in the form of writing the meaning of the idiom, not using it in a sentence, as well as using it in a real sense, as in the pre-test. Students who did not use it in a sentence wrote the meaning of the idiom correctly, but did not get points because they did not form a sentence. From this point of view, it can be interpreted that AR application has a positive impact on students' understanding of the meaning of the idiom, making more qualified sentences, and therefore on the level of learning the idiom.

In the fifth question in the Idioms-Sentence Forming Form, students were asked to use the idiom "give shape to something" in a sentence, considering the meaning of it. When the answers given are examined, the rate of correct answers increased from 26.7% to 93.3%, as shown in Table 11. The number of blank and incorrect answers decreased significantly. In the pre-test correct answers are

given such as, “I gave shape to the kinetic sand.”, “Let's give shape to the play dough.”, “I gave shape to the cookies.”. The incorrect answers in the pre-test and post-test as in the example “I gave shape to my car.”, given as the use of the idiom inconsistent with its meaning. In the post-test, the correct answers were generally given in the form of styling the hair, which is also included in the video recording accessed by the students through the AR application. The correct answers in the examples “I gave shape to my hair before I came to school.”, “Can I give shape to your hair?”, “I gave shape to the dough with my friend.” are noticeable in terms of using the idiom in the correct sense. From this point of view, it can be interpreted that AR application has a positive impact on students' understanding of the meaning of the idiom, making more qualified sentences, and therefore on the level of learning the idiom.

In the sixth question of the Idioms-Sentence Forming Form, the students were asked to use the idiom "barge in" in a sentence, considering its meaning. When the answers given are examined, the rate of correct answers increased from 46.7% to 100% as can be seen in Table 11. In the pre-test, "My friend was saying something, so I barged in.", "While my mother was talking, I barged in.", "Elif, please don't barge in." correct answers stand out. On the other hand, the wrong responses, in addition to using the idiom "barge in" also conjugate the idiom in the form of "I've barged in.", which give no indication that the participant understands the idiom. In the post-test, all students used the idiom in accordance with its meaning and structure. Following sentences are the examples of the use of the idiom in accordance with its meaning and structure: Aysun, "We're talking here, don't barge in.", Veli, "Gülçin was suddenly barged in while Erdem was talking.", Nuray, "Ayse barged in while I was talking to my teacher.". From this point of view, it can be interpreted that AR application has a positive impact on students' understanding of the meaning of the idiom, making more qualified sentences, and therefore on the level of learning the idiom.

In the seventh question in the Idioms-Sentence Forming Form, students were asked to use the idiom "to tidy up" in a sentence, considering its meaning. When the answers given were examined, the rate of correct answers increased from 40% to 80%, as seen in Table 11. The number of blank and incorrect answers decreased significantly. In the pre-test, the answers “Girl, tidy up your room.”, “I fell, but I got up and tidied myself up.” are noteworthy. The incorrect answers given in the pre-test were given not only by not using the idiom in the sentence, but also by using it in the meaning of "arranging something". In the post-test, "Ali, tidy up under the desk.", "Sevgi has tidied up her clothes.", "You have to tidy yourself up for your grades to be good." correct answers are noteworthy. The incorrect answers given in the post-test were as in the example of “I tidied up the lesson.” It is

done by someone who does not fit the meaning, does not have the authority to make it right, or as in the example of "Ali was very naughty, the teacher tidied him up." In addition to being left unfinished, it is given as situations where multiple factors play a role, and the correction is not made by a single person. From this point of view, it can be interpreted that AR application has a positive impact on students' understanding of the meaning of the idiom, making more qualified sentences, and therefore on the level of learning the idiom.

In the eighth question in the Idioms-Sentence Forming Form, students were asked to use the idiom "to go silent" in a sentence, considering its meaning. When the answers given are examined, the rate of correct answers increased from 6.7% to 66.7%, as can be seen in Table 11. The number of blank and false answers decreased significantly. It may have made it difficult for students to understand the meaning of this idiom compared to other idioms, as it reminds them that the voice is literally muted and that there is sound no sound at all. In the pre-test, the correct answer that the student with the nickname Melek gave "I went silent with fear." answer stands out. The incorrect answers, on the other hand, are given by literally interpreting the idiom which does not give an idea about the idiom as in the example of "Mom, my voice has gone silent." or by simply conjugating the idiom "My voice has gone silent". In the post-test, the sentence of the student named Mehmet, "When my mother heard the news, her voice went silent." and Sevgi's sentence "While I was at the party, a famous person suddenly appeared before me, my voice went silent." and Ayten's sentence, "When the teacher started writing the assignments, everyone went silent." are examples. There is an increase in the quality of the sentences formed by the students from the pre-test to the post-test. Incorrect answers given in the post-test were misinterpreted by literally interpreting and using it in the wrong sense as not making any sound, being silent, or lowering the sound. From this point of view, it can be interpreted that AR application has a positive impact on students' understanding of the meaning of the idiom, making more qualified sentences, and therefore on the level of learning the idiom.

In the ninth question in the Idioms-Sentence Forming Form, students were asked to use the phrase "go out of sight" in a sentence, considering its meaning. When the answers given are examined, the rate of correct answers increased from 53.3% to 80% as can be seen in Table 11. The number of blank and incorrect answers decreased significantly. In the pre-test, correct answers are usually given as the disappearance or disappearance of different people by different students as in the example "My brother suddenly went out of sight." The dialogue: Aysun, "Elif said, 'I'm go look for my friend.'" "Okay," said Selin. When Elif came, she said to Selin, "Elif has gone out of sight." is a striking example. In the post-test, as in the example "The black cat suddenly went out of sight.", making

sentences such as the disappearance and disappearance of different people by different students, as well as Sevgi's sentence "Aaa! Where is Sevilay? She suddenly went out of sight." and Cihan's sentence "My friend was telling me something, then he went out of sight." stand out. In the pre-test and post-test, the incorrect answers were given as not using the idiom in a sentence or writing its meaning. From this point of view, it can be interpreted that AR application has a positive impact on students' understanding of the meaning of the idiom, making more qualified sentences, and therefore on the level of learning the idiom.

In the tenth question in the Idioms-Sentence Forming Form, students were asked to use the phrase "like a pearl" in a sentence, considering its meaning. When the answers given are examined, the rate of correct answers increased from 26.7% to 93.3%, as can be seen in Table 11. The number of blank and incorrect answers decreased significantly. In the pre-test, the correct answers are given in the following form: "The child writes like pearls.", "Your teeth are like pearls, always brush like this. OK?". The incorrect answers were given in the form of meaning the ornamental grain formed in the sea animals by interpreting it with real meaning, "Her diamond shone like pearls." In the post-test, the correct answers are "The doctor said my teeth are like pearls," as in the video recording that students access through the AR application. The students used the word tooth to use the idiom "like a pearl". Emre's sentence "What a beautiful, pearl like handwriting you have!" differed from other student answers in the posttest. The incorrect answer in the post-test was given as not using the idiom in a sentence. From this point of view, it can be interpreted that AR application has a positive impact on students' understanding of the meaning of the idiom, making more qualified sentences, and therefore on the level of learning the idiom.

Discussion and Conclusion

Within the scope of the study, the answer to the question: "Do the pre-test and post-test results of the experimental and control groups differ?" has been sought. As a result of the analysis, a significant difference was observed between the pre-test and post-test results of the experimental group students, while there was no significant difference between the pre-test and post-test results of the control group. AG applications have shown a positive impact on the development of idioms learning levels of primary school 2nd grade students. This result show similarities with Chiang, Yang and Hwang (2014), Çakır, Solak and Tan (2015), Estapa and Nadolny (2015), Ersoy, Duman and Öncü (2016), Küçük (2015), Özarslan (2013), Sırakaya (2015), Solak and Çakır (2015), Şahin (2017), Hsu (2017), Tosik Gün and Atasoy (2017), Korucu, Gençtürk and Sezer (2016), Çevik et al. (2017). These studies show that AR applications have a meaningful impact on facilitating learning and

success. However, there are also studies in the literature that conclude that AR applications do not have a significant impact on learning or achievement (İbili, 2013; Yılmaz 2016). The reason for this difference in the literature may be due to the application of researches in different disciplines. It can also be attributed to the fact that it was implemented in different age ranges. As a result, it can be said that the majority of studies stating that the use of AR applications in education creates significant differences on learning and success. In addition, the answers given by the students in the Idioms-Sentence Forming Form were evaluated in order to determine whether the idiom that was taught was fully learned and put into practice by the students and to support the research result. After the application, the number of correct answers increased, and the number of blank and incorrect answers decreased significantly. Students who answered correctly in the pre-test, on the other hand, formed more qualified sentences regarding the meaning of the idiom in the post-test. AR applications had a positive impact on students' learning levels of idioms.

Recommendations

Based on the main findings of the study, the following recommendations were made:

- In the research, it was concluded that augmented reality applications were effective in improving the vocabulary of primary school 2nd grade students in terms of idioms. AR applications can be used to concretize words, reduplications, proverbs, stereotypes, etc., which are the other components of vocabulary in teaching Turkish and make learning permanent.
- The study was conducted with primary school 2nd grade students. It can be carried out at different grade levels and with more participants.
- A qualitative dimension can be added to the research by taking the opinions of teachers and students about the application.
- Researches can be done on the usability of AR applications in other disciplines.
- The impact of different technologies can be researched to improve vocabulary.

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