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# Effect of khan academy-aided teaching on academicachievement in English course *

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**Abstract**

The purpose of this study is to investigate the effect of Khan-Academy-assisted grammar teaching on academic success in English lesson. The videos used in the study were downloaded from the Khan Academy (n.d) website. The sample of the study consists of 67 students (34: experiment group, 33: control group) in Sadreddin Konevi Anadolu İmam Hatip High School that is located in Yeşilyurt, Malatya, Turkey. Semi-experimental design with control group of pre-test post-test was used. During the experimental procedure, the videos in Khan Academy about present, past and future tense in English were watched by the experiment group. Teaching process of control group was organized in accordance with English Curriculum. "The Achievement Test on Tenses" which was developed by the researchers was used both as the pre-test and the post test.
At the end of the study, it was concluded that Khan Academy video-assisted grammar teaching made a significant difference on academic success in English lesson.

Keywords: Grammar, video, khan academy, English lesson, academic success.

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## 1. Introduction

Language is one of the most important elements by means of which people and societies can communicate with one another. It is one of the most important way to share the ideas and feelings. It is not only a means of communication, but also it reflects the way people live and think. While language contributes the progress of science and technology, it also sheds light on the history (Toklu, 2007, p.13). There is also a relation between English reading proficiency and academic performance (Stoffelsma & Spooren, 2019)

In order to follow scientific, artistic, commercial, social developments and changes in today's information era, just a mother tongue cannot be sufficient. English is the most common language people use when communicating with one another. This situation makes it necessary to learn it. In our country, a big importance is given to foreign language teaching. Since 2014, English has been started to be taught from the second grade at primary school.

Özen et al. (2013) 's results according to their needs analysis related to teaching English in public schools has showed that parents and students think learning English is necessary. However, 32% of the students and 84% of the parents were mastered in English only at the beginning or lower level. Moreover, the survey studies show that students are not able to make significant progress in English as they move to higher classes.

Although the main focus should be on communication in English teaching, when the conditions in our country, Turkey, are considered, the grammar knowledge is required in exams such as in YDS (Foreign Language Exam). Similarly, there is a need for grammar knowledge, even at the basic level, both in business applications and in obtaining scientific documents (Mozafari, El-Alayli, Kunemund & Fry, 2019).

Changes in learning theories in recent years have also affected the language teaching process (Freeman, 2020). Traditional foreign language teaching methods have begun to lose its effect as the computers are wide and the internet becomes a part of routine life. This rapid change has saved the education process from time and space. Studies have shown that the content will be more useful if it is meaningful for the students. Therefore, grammar teaching should not be considered separately from content and communication (Verhagen, 2019).

As a result of the research, it was not found a direct study about English language teaching aided by Khan Academy in Turkey. However, in mathematics teaching, one study on using the Khan Academy has been reached.

Zengin (2017) conducted a study investigating the effect of using mathematics software and Khan Academy in mathematics teaching with the "a flipped class" approach. The quantitative dimension of the study was assessed by Wilcoxon signed rank test and the qualitative dimension by content analysis. Quantitative data were obtained by pre-test and post-test scores of single-group students. Qualitative data were obtained by taking the student's opinion against the "flipped class" approach. Analysis results show that"a flipped class" approach designed with both Khan Academy and mathematical software significantly enhances the achievement of students in terms of double integral. Rao, Hilton, and Harper (2017) conducted case studies on Khan Academy videos in Chinese in the context of open educational resources. The analytical information provided by Netease Open has been used to identify the most watched videos in the Khan Academy. Analytical information from January 1, 2016 to September 30, 2016 has been utilized since there was no prior information before 2016. The results show that there is a big interest for these videos and the most popular videos among the others are on finance, economics, mathematics, science in Chinese Khan Academy videos. This

emphasizes the importance of additional learning and open licensed resources.

Kelly and Rutherford (2017) investigated the effects of the Khan Academy as a mathematics intervention in their experimental work with experimental and control groups for four weeks. In the study, the performances of students who took and did not take additional mathematics courses were compared at the same time. There was no significant difference in the test results in either case. However, there was a significant relationship between the evaluation measures taken at the Khan Academy and the measurements obtained from the test.

Adams (2016) examined the effects of Khan Academy on mathematics success by quantitative action research. In his work, he has worked with 5th grade students, consisting of 3 groups, totalling 70 students. Two of the groups used the accelerated mathematics method, while the other used only the Khan Academy. Analysis of the post-test results showed no significant difference between the two groups.

In an effort to explore the effects of computer-assisted instruction in business life lessons with an innovative educational approach, Gönül and Solano (2012) found that Khan Academy did not cause a significant increase in exam scores of the students, but increased the length of time students spent in the examination

In their research into the effects of using the Khan Academy to increase student participation in mathematics lessons in Chilean schools, Light and Pierson (2014) interviewed teachers about how they had incorporated the Khan Academy into their lessons. In total, 25 mathematics lessons in 48 schools where both Khan Academy videos were used and not used were observed. Classes range from 4th to 12th grade. Teachers have noted that the Khan Academy has improved procedural skills but does not support more complex issues. In the lessons used by the Khan Academy, students often quietly practice on an individual computer, teaching more questions than traditional classes.

Learning means a relatively persistent difference in an individual's behaviour. Very few of these behaviours are outside the learning output. Reflexes or some behaviours, for example, done just under some circumstances cannot be regarded as an output of learning behaviours. Teaching is the way making it possible for an individual to learn. The words learning and teaching are two different perspectives of the same process. From the point of view of the external factor providing the behavioural change, the existing situation is teaching; the thing happening when you look at the window of the individual who changes his behaviour is learning (Çırak, 2007).

Learning is an indispensable part of the individual, an essential necessity. The formal education institutions have emerged in order for the learning to take place in a planned manner. Despite the planned actions taken at these institutions, many students are faced with missing or inadequate learning. The reasons for this can vary widely. "Effective teaching" is one of these. In order to get an effective teaching, it is necessary to know the individual according to the developmental periods and how the learning takes place. To facilitate learning and make it more permanent, the tasks of teacher are to create effective learning environments. One of the ways to achieve these is to choose the appropriate teaching tools and equipment. The more sensory organs are involved, the more permanent the learning will be. That is, as a result of using audio-visual tools in teaching, learning will be faster and more permanent (Oral, 2007).

While education technology is concerned with the planning, implementation, testing and development of all aspects of individual learning, teaching technology can be regarded as regulated technologies in a subject area, taking into consideration that teaching is a sub-dimension of education. For example, "language teaching technology" (Saban, 2012, pp. 57-59).

The educational system of a country has a very important role in the progress of it. It is unacceptable that the education system remains the same in the age of information, where everything is moving and

changing very fast. The two most important elements of modern education are the technology and the teacher that can adapt to this new technology. With a traditional approach, keeping up with the traditional tools and equipment will be a useless effort. A technology- enhanced education will provide job satisfaction for teachers and make learning easier and faster for students. A study conducted at the Drexel University in the United States between 1988-1997 attempted to find out how much the information provided by the different methods remained in students' minds. With high visual and audio possibilities, the interactive multimedia environment is found to be one of the methods (90%) providing the highest rate of recall (Vural, 2004).

An educational software according to Vural (2004, p. 213-216) is compatible with the curriculum programs specified by the Ministry of National Education, is easy to use, encourages for learning, and includes multimedia technology which is developed and updated like audio, video, dimensions.

It is possible to connect to the current and valid educational softwares which will provide learning diversity in education via internet. Learning through the Internet is carried out by utilizing the possibilities provided by the Web in order to provide meaningful and lasting learning. One of the usage areas of the internet-based learning is to provide internet support to the lectures (Şahan, 2015).

In this research, the researcher had previously downloaded the videos in Khan Akademy and presented the class, considering the possibility of internet interruption. Videos have been used for foreign languages teaching for a long time. While teaching with videos offers individual learning opportunities, it provides students to watch them on their own or under teacher-control in multiple times. The teacher should consider the subject area, the course objectives and the student's level when selecting the videos. The duration of the videos should be 1 or 2 minutes in the beginner level, 3 or 5 minutes in the intermediate level, and 10 or 15 minutes in the advanced level (Günday, 2015, p. 226-227).

In this research, the researcher, who is teacher at the same time, paused the videos and make explanations at points where she thinks that the students are confused. In addition, she strengthened the videos by worksheets about the tenses. The experimental group worked on the worksheets after watching videos.

A web-based educational software, Khan Academy offers lessons on mathematics, science, economics/finance, arts/social sciences, and computer science with over 10,000 videos and more than 150,000 interactive exercises. Khan academy is a technology-supported education model that offers the opportunity for teachers to learn in their classes, for students to learn at their individual speeds, for parents to learn in their homes, with equality of opportunity and lifelong learning (Khan Academy, 2017).

In this work under the title of "arts and social sciences (arts / humanities)", the videos called as "the introduction to grammar", "introduction to verb tense", "the present tense", "introduction to irregular verbs", "the past tense" and "the future tense" were shown to the students in the experimental group for 5 weeks. The teacher paused the videos where she needed and emphasized important points and distributed working papers to the students.

Despite the importance given to teaching English in our country, most students who graduate from the high school do not even know the basic sentence patterns in English, and have difficulty in making simple sentences. By emphasizing that the communicative dimension of language should not be ignored, the importance of the English grammar knowledge in Turkey is great. When examining the 9th grade English curriculum, it appears that more emphasis is placed on the communicative dimension, where grammar rules are backward. However, students who cannot grasp these rules cannot dominate the language either in writing or verbally. Khan Academy, which gets the facilities of technology with

grammar teaching, makes the learning more enjoyable and lasting. There are few studies on Khan Academy-aided teaching. They are generally about teaching of mathematics. For this reason, the study is important in terms of filling deficiencies in the field.

### *1.1. Research problem*

What is the effect of English language teaching aided by Khan Academy on the academic success of students?

a. Is there a significant difference in academic success between the post-test scores of the experimental and control groups?
b. Is there a significant difference in academic success between the pre-test and post-test scores of the experimental groups?
c. Is there a significant difference in academic success between the pre-test and post-test scores of the control groups?

## 2. Method

### *2.1. Sample*

The sample of the study consists of 67 students (34: experiment group, 33: control group) in Sadreddin Konevi Anatolian Imam Hatip High School that is located in Yeşilyurt, Malatya, Turkey.

Table 1. Distribution of students participating in research by group and sex

| | | Gender | | | |
|---|---|---|---|---|---|
| | | Female | | Male | |
| Group | n | f | % | f | % |
| Experimental | 34 | 18 | 53 | 16 | 47 |
| Control | 33 | 22 | 66,7 | 11 | 33,3 |
| Total | 67 | 40 | | 27 | |

### *2.2. Data Gathering Tools*

Within the scope of this research, a questionnaire with 30 questions in present, past and future time was applied to 100 students in the upper grade studying at Sadreddin Konevi Anatolian Imam Hatip High School in Yeşilyurt, Malatya to develop the pre-test form. Before the test was prepared, a table of specificiation about 7 goals in present, past and future tense was made. These 30 questions were selected from a guestion pool including 145 questions in the tests by the Ministry of National Education, in Khan Academy, and in a book for 9th grade students for English lesson, called as Marathon. In this election, another group of 15 students were asked to read the questions and specify what they understood from the questions to ensure that the structure was valid. By taking the opinion of the relevant field experts, 145 questions were reduced to 30 questions. After the initial application of 30 questions, the test items were subjected to item analysis, in which some items were completely removed from the test and the necessary corrections were made. As a result, the last number of

questions is 25. The KR 20 reliability coefficient calculated over 25 questions is 0.72. The timetable for experimental process is presented in Table 2.

Table 2. Timetable for experimental process

| Weeks | Process |
|---|---|
| | Application of pre-tests to experiment and control group and determination of groups<br>40 minutes |
| 1st week | The researcher introduced Khan Academy to the experimental group and presented the video called "introduction to grammar" in the attention drawing phase of the course. Then, the |
| 2nd week | students watched the video called "introduction to verb tense". The researcher sometimes paused the videos to make some points clear. After that, the students completed worksheets.<br>40+40 minutes |
| 3rd week | The experimental group watched the video called "the present tense". The researcher sometimes paused the video to make some points clear. After that, the students completed worksheets.<br>40 minutes |
| 4rd week | The experimental group watched the video called "introduction to irregular verbs". The researcher sometimes paused the video to make some points clear. After that, the students completed worksheets.<br>40 minutes<br>The experimental group watched the video called "the past tense". The researcher sometimes paused the video to make some points clear. After that, the students completed worksheets. |
| 5th week | 40+40 minutes<br>The experimental group watched the video called "the future tense" The researcher sometimes paused the video to make some points clear. After that, the students completed worksheets. |
| | Application of post-tests to experiment and control group |

The experimental procedure shown in Table 2 was applied by the researcher. In the experimental group, the process was conducted for two lesson hours in the 2nd and 5th weeks, and one lesson hour in the other weeks. In the control group during the same period and weeks, the sample activities in the textbook were processed according to the lesson plan in the English curriculum.

*2.3. Procedure and Data Analysis*

Table 3. The results of Kolmogorov-Smirnov test about the pre-tests of the experiment and control groups

| Groups | N | $\bar{X}$ | Median | Kolmogorov-Smirnov (p) |
|---|---|---|---|---|
| Experiment | 34 | 54,0 | 54,0 | ,196 |
| Control | 33 | 56,85 | 64,0 | ,000* |

*p<,05

At first, the pre-test was administered to both experimental and control groups. Then, Kolmogorov-Smirnov test was used to check the normal distribution. While the experimental group displayed the normal distribution, the control group didn't. Therefore, the differences between groups were analysed

statistically by using Man-Whitney U test and there was no significant difference (P>0.05) between them.

Table 4. The results of Mann-Whitney U test about the pre-tests of the experimental and control groups

| | N | | Mean Rank. | Sum of ranks. | U | Z | p |
|---|---|---|---|---|---|---|---|
| Pre-test | Experiment | 34 | 31,16 | 1059,50 | 464,50, | -1,217 | .224* |
| | Control | 33 | 36,92 | 1218,50 | | | |
| | Total | 67 | | | | | |

*p<,05

A Mann-Whitney U test was run to determine if there were differences in pre-test scores between experimental and control groups students. Distributions of the pre-test scores for experimental and control groups were similar, as assessed by visual inspection. Test score was not statistically significantly higher in experimental group (Mdn = 54.00) than in control (Mdn = 64.00), U = 464,50, z = -1,217, p = ,224.

After the experimental process, the pre-test was applied to each group as post test.

Table 5. The results of Kolmogorov-Smirnov test about the post-tests of the experimental and control groups

| Groups | N | $\bar{X}$ | Median | Kolmogorov-Smirnov (p) |
|---|---|---|---|---|
| Experiment | 34 | 77,88 | 80,00 | ,000* |
| Control | 33 | 66,67 | 68,00 | ,002* |

*p<,05

Kolmogorov-Smirnov test about the post-test of groups showed that each group did not display normal distribution. Therefore, the differences between groups were analysed statistically by using Man-Whitney U test.

## 3. Results

The experimental and the control groups were tested before and after the application process. According to data obtained, it was investigated whether there were any significant difference between the median scores of groups.

Table 6. The results of Mann-Whitney U test about the post-tests of the experiment and control groups

| Groups | N | Sıra Ort. | Sıra Top. | U | p |
|---|---|---|---|---|---|
| Experiment | 34 | 40.26 | 1369,00 | 348,00 | ,007* |
| Control | 33 | 27,55 | 909,00 | | |

*p<,05

According to the results of Mann-Whitney U test run to compare the post-test scores of experiment group exposed to English language teaching aided by Khan Academy and control group exposed to English Curriculum, a statistically significant difference was observed in favour of the experimental group among the achievement scores (U = 348,00, p<,05). Taking into consideration mean ranks, it was seen that the students who are supported by Khan Academy are more successful than those who are learning by English curriculum.

Table 7. The results of Wilcoxon Signed Ranks test about the pre-test and post-test of the experimental group

| Pre-test-Post-test | N | Sıra Ort. | Sıra Top. | z | p |
|---|---|---|---|---|---|
| Negative Ranks | 5 | 5,40 | 27 | -4,633 | ,000 |
| Pozitive Ranks | 29 | 19,59 | 568 | | |
| Ties | 0 | | | | |

*Based on positive ranks.

34 participants were recruited to understand the effect of English Language Teaching aided by Khan Academy on achievement test on tenses. Of the 34 participants recruited to the study, the academic success in the post-test elicited an increase in 29 participants compared to the pre-test whereas five participants did not get success as high with the pre-test score. The difference scores were symmetrically distributed, as assessed by a histogram. A Wilcoxon signed-rank test determined that there was a statistically significant increase in academic success (Mdn = 28.00%) when subjects imbibed the post-test (Mdn = 80.00%) compared to the current teaching methods (Mdn = 54.00%), z =
-4, 633 p = .000.

Table 8. The results of Wilcoxon Signed Ranks test about the pre-test and post-test of the control group

| Pre-test-Post-test | N | Sıra Ort. | Sıra Top. | z | p |
|---|---|---|---|---|---|
| Negative Ranks | 8 | 15,31 | 122,50 | -2,463 | ,014 |
| Positive Ranks | 23 | 16,24 | 373,50 | | |
| Ties | 2 | | | | |

* Based on positive ranks.

33 participants were recruited to understand the effect of English Language Teaching Curriculum on achievement test on tenses. Of the 33 participants recruited to the study, the academic success in the post test elicited an increase in 23 participants compared to the pre-test, whereas two participants saw no improvement and eight participants did not get success as high with the pretest score. The difference scores were symmetrically distributed, as assessed by a histogram. A Wilcoxon signed-rank test determined that there was a statistically significant increase in academic success (Mdn = 12.00%) when subjects imbibed the post-test (Mdn = 68.00%) compared to the current curricula (Mdn = 64.00%), z = -2.463, p = .014.

## 4. Discussion and Conclusion

According to the results of Wilcoxon Signed Ranks test conducted to reveal whether there is a significant difference between the pre-test and post-test scores of the control group, it was concluded that there was a statistically significant difference between the test scores. The difference in favor of the positive ranks shows that the teaching conducted according to the 2017-Secondary Education English Curriculum has a significant effect on the academic success of the students. The findings of the study conducted by Akpinar & Karadeniz (2015) support this finding. The researchers covered the topics in the control group with a workbook provided by the Ministry of National Education. In both studies, a significant difference was found between the pretest and posttest scores of the control group in favor of the posttest.

The findings of the study carried out by Gömleksiz and Düşmez (2015) comparing the current method with computer-assisted teaching in English teaching are similar to the findings of this sub-problem. While the control group learned the subject of relative clause with the help of the current textbook, as a result of the Wilcoxon Signed Ranks test, a significant difference was found between the pre-test and post-test scores in favor of the post-test. This shows that the teaching carried out with the existing methods has a significant effect on students' academic success.

According to the Wilcoxon Signed Ranks test result, a statistically significant difference was observed between the pretest and posttest scores of the experimental group. The difference is in favor of positive ranks, showing that video-supported learning has a significant impact on students' academic success. The findings of the study conducted by Zengin (2017) support this finding. In the study, he observed that using mathematics software and Khan Academy significantly increased student success in teaching mathematics.

According to the results of Mann-Whitney U test conducted to compare the post-test scores of the control group studying according to the 2017-Secondary English Course Curriculum with the video-supported experimental group, a statistically significant difference was observed in favor of the experimental group. When the average of the ranks are taken into consideration, it is seen that the students who are supported with video are more successful than the students who study according to the Curriculum.

The findings of Kelly & Rutherford (2017) 's studies differ from the results of this sub-problem. In the research, the effects of Khan academy as a mathematics intervention were investigated, but no significant difference was observed in the post-test scores of the experimental and control groups. The reason for this difference may be the use of Khan Academy in different courses. In the study of Kelly and Rutherford (2017), students worked individually on the Khan Academy in a classroom setting. The students were not specified on which subjects they would study, but they made this choice. However, in this study, the teacher decided which videos to watch and brought them to the classroom.

In the study of Kelly and Rutherford (2017), the lessons were fully based on Khan Academy and no additional explanations were made by the teacher about the content. In this study, the videos in Khan Academy were used as supportive, and after the examples given by the teacher, the rules were made clearer with the examples given by the students. After the videos, students were given worksheets and their development was followed in this way.

The results of the study conducted by Gonul & Solano (2013) differed from the results of this study. The students of Business Administration have studied some topics through Khan Academy and given online homework. As a result, there was no significant difference between the exam scores of the experimental and control groups. In the study conducted by Gonul & Solano (2015), unlike this study, students watched videos outside the classroom environment. This may have occurred because this does not guarantee that students have watched the videos. In this study, the processes such as watching videos and completing worksheets were carried out under the supervision of the teacher.

The results of this study show that the students get higher academic success in English courses with Khan Academy than the courses with English curriculum only. However, in this study, the learners did not just follow the videos of the Khan Academy. The teacher supported the process with the worksheets and explanations in experimental group.

Khan academy videos motivated the learners by adding vitality to the courses and created a dynamic learning environment. They made the lessons more visual. In addition, one of the biggest handicaps of video instruction is that the teacher may be too passive in the process and the learners cannot decide which information is more important for them. In this research, due to the short duration of the videos and to cope with this problem, the teacher occasionally needed to pause the videos and give more

explanation and more examples. On the other side, in accordance with the English curriculum, she did not explicitly mention the rules and the learners were expected to perceive them.

Although the communication is dominant in the courses according to the English curriculum, the learners in control group were not as successful in the grammar-based examination as the learners in experimental group exposed to the courses supported by Khan Academy.

## 5. Recommendations

The teachers may want the students to watch the videos of the Khan Academy outside of the class before the lesson time. However, if the process is not supported by the teacher, the learners may not exactly benefit from the videos. The effects of Khan Academy in other fields, or in English with different subjects can be investigated.

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