

The Effect of Techno-Pedagogically Designed 5E Learning Model on Student Success and Attitude toward Turkish Class*

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Abstract

The aim of this study is to examine the effect of the 5E learning model designed in accordance with a techno pedagogical lesson plan on student success and attitude in a Turkish course. The research is quantitative and uses a quasi-experimental model with pre-test/post-test control groups. The universe of this study consisted of 8th grade students studying in the Onikişubat district of the province of Kahramanmaraş in the 2019-2020 academic year. The sample of the study consisted of 110 students studying in four different classes from within this same population.

The lessons in the experimental group were taught using a 5E learning model designed in accordance with a techno pedagogical lesson plan, while the lessons in the control group were based on the methods described by the Turkish lesson curriculum. In this study, the "Attitude Scale Towards Turkish Lessons" (ASTTL) and "Turkish Course Academic Achievement Test" (TCAAT) were used as data collection tools. In the analysis of the data obtained in the study, the independent sample t-test and the correlated sample t-test were used. As a result of the research, a statistically significant difference was found in favor of the experimental group between the average achievement scores of the students in the experimental group and those of the students in the control group. However, a statistically significant difference was not found between the average attitude scores of the experimental group versus the control group.

Keywords: Techno Pedagogic Lesson Plan, 5E Learning Model, Academic Success, Attitude

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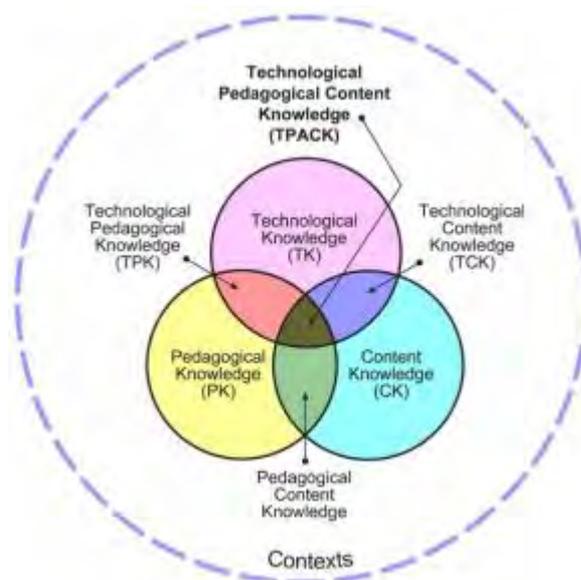
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INTRODUCTION

Today, developments in science and technology have deeply affected the field of education and have caused a multifaceted change and transformation that is known as the digital revolution in education (Parlak, 2017). Interactive technological tools have been used in education and training from the Web 1.0 period (also known as the monoweb) up to Web 5.0.

With the use of technology in education, a new learning culture in which digital learning objects come to the fore has been formed (Yaman, Demirtaş, & İleri Aydemir, 2013). In this context, information and communication technologies (ICT) have also been integrated into the educational environment in Turkey (Ersoy, Kabakçı Yurdakul & Ceyhan, 2016). As a result, technology has started to be used in education by integrating it with learning processes, content, and pedagogy rather than being used solely as a material, and this has brought forth the concept of "techno pedagogical education" (Argon, İsmetoğlu, & Yılmaz, 2015). Techno pedagogical education is defined as the implementation of all stages of the teaching process from planning and execution to the evaluation of teaching through the use of technological pedagogical content knowledge with the intention of increasing the effectiveness of teaching practices (Kabakçı Yurdakul & Odabaşı, 2013: 55). The complex roles and interactions of content, pedagogy, and technology, which are the three main components of learning environments today, need to be determined (Mishra & Koehler, 2006). Components of techno pedagogical education as they are understood today are presented in Figure 1.



**Figure 1: Technological, Pedagogical, and Content Knowledge (TPACK) Model Source(s):
www.tpack.org, 2020**

In 2006, a radical change was made in the Turkish education system, shifting from teacher-centered to student-centered education and from a traditional approach to one that is more constructivist (MoNE, 2006). In the 2006 Primary Education Turkish Lesson Curriculum, for the first time, skills such as correct and effective use of Turkish, critical thinking, creative thinking, communication, problem solving, research, decision-making skills, as well as the ability to use information technologies were included among the basic skills. In addition, the general competencies of the Turkish education system were included in the syllabus, and it was emphasized that the digital competence would also be a requirement for Turkish lessons. The same approach was followed in the Turkish Language Teaching Program, which was put into practice in 2019 by the Ministry of National Education (MoNE). It was stated that digital competence, including the use of Information and Communication Technologies (ICT) with a critical approach, is indispensable for business, daily life,

and communication (MoNE, 2019). Under the learning-teaching approach of the program, it was emphasized that the use of ICTs in learning environments would support student learning by enriching the teaching strategies of the teachers. For this reason, it was recommended to use ICTs in all learning processes. In the program, students are encouraged to collect and organize data in the digital environment and to present their results in the classroom environment. In addition, the MoNE states that teachers should include digital materials in the learning and teaching process with the expression "Visual communication tools should be included in the course and applications; slide, computer, television, interactive board, internet, EBA contents etc. should be used effectively" (MoNE, 2019a).

Thanks to the possibilities offered by technology, classical course tools such as books, notebooks, and chalkboards have become insufficient in the learning and teaching process, and new technologies have now become a necessity in the educational environment (Aslan & Kuşçu, 2018). Thanks to features such as distribution, presentation, storage, ability to access information, and the ability to analyze and evaluate information, digital materials have come to the fore in the learning and teaching process (Mercan, Filiz, Göçer, & Özsoy, 2009). In this context, the Turkish project known as the Movement to Increase Opportunities and Technology (FATİH) aimed to provide educational technology materials to schools and brought a new dimension to the long term digital transformation in education (Benzer, 2019). The General Directorate of Innovation and Technologies of the Ministry of National Education designed the Education Information Network (EBA) as an education platform with e-content in order to use information, technology equipment, and digital education materials in schools within the scope of the FATİH project and made it available to education stakeholders (Argon et al., 2015). When all these developments are taken into consideration, it can be concluded that there are important studies on the use of technology and digital content design in the Turkish education system.

The methods and educational materials chosen in the learning-teaching processes inspire a desire to learn within the learner, and the use of technology in education creates a variety in methods and materials (Güven & Karataş, 2005). In this context, teachers use the 5E learning model envisaged by the constructivist education model by integrating technology with students, enabling students to contribute to their development as individuals who can recognize problems and find different solutions to them, think analytically, recognize and use technology actively, and research (Gül, 2011). In addition, educational technologies employed in educational processes along with contemporary methods can reduce personal differences in learning (Kırkkılıç & Şahin, 2007), and enable digital learning culture to be settled (Yaman et al, 2013).

It is necessary to design learning processes using technology in educational environments, to make electronic evaluations, to develop e-materials by using educational software and web resources effectively, and to put them into practice in line with a techno pedagogical lesson plan (MoNE, 2018). However, the practice in Turkey is different as Turkish grammar is taught using a behavioral approach which includes linguistic rules and the teaching of each subject with limited examples within a frame, all of which make Turkish lessons monotonous for learners (Güneş, 2013). This is reflected as failures in Turkish courses in Turkey due to the negative experiences. The most important indicators of this are the low Turkish course scores of students in central exams. According to the preliminary results report of OECD PISA (International Student Assessment Project) in 2018, student reading skill is calculated as 466.37 in Turkey (MoNE, 2019b), while the average score for OECD countries in this skill is 487.. Turkey ranks 40th in the field of reading skills among 79 countries who participated in PISA 2018, it ranks 31 among the 37 OECD countries.

As is clear from the report, Turkey is situated in the last five among OECD countries in the area of reading skill indicating that is it statistically below the OECD average (ERG, 2020). Since the way to be successful in education is through effective Turkish education (Yılmaz, 2015), Turkish is taught as a compulsory course at every stage of education from primary school to university (Erçapan, 2018). Considering that Turkish takes place at all levels of education, that success in Turkish also affects academic success in other lessons (Yılmaz, 2015), and that student success in Turkish is low

(ERG, 2020; MoNE, 2019c), research is needed related to how students can develop a positive attitude towards the lesson. In addition, according to the learning-teaching approach of the Turkish Lesson Curriculum put into practice in 2019, using ICTs as much as possible in the learning process, as well as using slides, computers, televisions, interactive whiteboards, the internet, and EBA effectively in the course and applications was recommended (MoNE, 2019a). However, information on how to organize lessons or activities related to this situation remain limited. Considering all these situations, this study specifically aims to discover whether there is a statistically significant difference between the mean scores of the Turkish Course Academic Achievement Test (TCAAT) and the Attitude Scale Towards Turkish Lessons (ASTTL) of 8th grade students studying the subject of “Elements of the Sentence” in Turkish lessons using either the method described by the Turkish curriculum or the 5E learning model designed in accordance with a techno pedagogical lesson plan.

METHOD

Research Design

The research is quantitative in nature and uses a quasi-experimental model with pre-test/post-test control groups. The quasi-experimental model is used especially in social science research when the controls required by real trial models cannot be achieved (Karasar, 2012). In the experimental research, the researcher applies comparable procedures and then examines their effects (Büyüköztürk, Kılıç Çakmak, Akgün, Karadeniz, & Demirel, 2018).

Universe and sample

The universe of the study consisted of 8th grade students studying in the Onikişubat district of the Kahramanmaraş province in the 2019-2020 academic year. The sample of the study consisted of 110 students studying in four different classes from within the same population. The lessons in the experimental group were taught with a 5E learning model designed in accordance with a techno pedagogical lesson plan, while the lessons in the control group were based on the methods described by the Turkish lesson curriculum.

The Role of the Researcher

The researcher attended the following courses organized by the Ministry of National Education: FATİH Project Interactive Classroom Management Course, FATİH Project Lesson Flow Design Course, FATİH Project Conscious and Safe Use of IT and the Internet Course, FATİH Project Technology Supported Literature Turkish Instructor Training Course, and FATİH Project EBA V Class Courses. The researcher is an expert in preparing techno pedagogical lesson plan activities. The researcher has 17 years of professional experience and works as a teacher for the MoNE. The researcher also has experience in teaching using methods defined by the Turkish course curriculum, as in the control group lessons.

Research Process

The lessons in the experimental group of this research were taught within the scope of a 5E learning model designed in accordance with a techno pedagogical lesson plan on "Elements of the Sentence". In the control group, a Turkish lesson on the same subject was taught using the method described by the Turkish national curriculum. Before teaching the lesson, the TCAAT and ASTTL were administered to students in both the experimental and control groups as a pre-test to determine the effectiveness of the lesson application. The lesson for each group was carried out in the following order:

Defining the Aim: Objectives related to the subject to be learned and student achievements taken from the Turkish education program were clearly conveyed to the students.

Preparation of Teaching Tools and Materials: The researcher prepared a lesson plan in accordance with the 5E learning model, designed in accordance with the techno pedagogical lesson plan to be used in the experimental group, taking into consideration the outcomes of "Elements of the Sentence" and the plan format shown by the Ministry of National Education YEĞİTEK Education Services Coordination. In the control group, a plan was prepared according to the program defined by the Turkish Course Teaching Program. At the same time, the teaching materials to be used in the lessons were created in accordance with the lesson plan.

Application: The activities to be carried out and the materials to be used within the scope of the 5E learning model were introduced to the students in the experimental group at the beginning of the course. Students who did not have an EBA password were provided with one through the MoNE Education Information Network (EBA) system. A wall related to the elements of the sentence was created using the Padlet application. The contents developed by the researcher using various WEB 2.0 tools were put into practice within the scope of the lesson plan. Interactive boards, EBA, and other educational digital learning platforms (private and official) were actively used in the process. Educational material in digital format was sent via EBA for the students to review the lesson subject at home.

The implementation of the 5E learning model designed in accordance with the techno pedagogical lesson plan was carried out as follows, based on the interactive classroom management education lesson preparation instruction developed by MoNE YEĞİTEK:

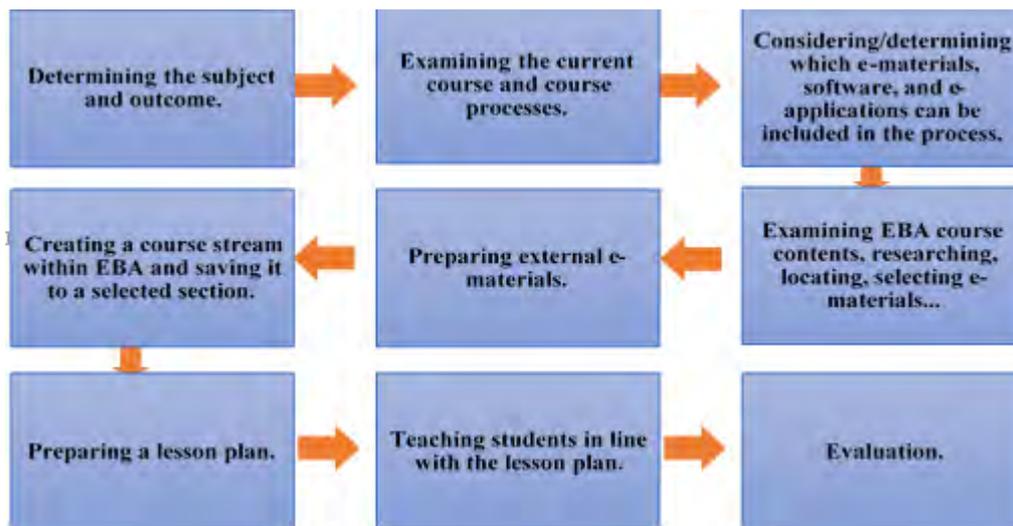


Figure 2. The Process Scheme of the Lesson in the Experimental Group

Evaluation: At the conclusion of all activities, an evaluation of the course was carried out using technological tools.

In the control group, the lessons were taught without any intervention to the students. Purpose, content, learning-teaching process, and evaluation were carried out using the method defined by the Turkish course curriculum.

The application was carried out in both groups on the 8th grade Turkish lesson "Elements of the Sentence" over 7 weeks and 8 lesson hours. The TCAAT and ASTTL were re-administered as a post-test to students in both groups to determine the effectiveness of the application immediately after the application was completed.

Data Collection Tools

The "Turkish Course Academic Achievement Test" (TCAAT) and the "Attitude Scale Towards Turkish Lessons" (ASTTL) were used as data collection tools in the study.

Turkish Course Academic Achievement Test

The TCAAT consists of 20 multiple choice questions and was developed by the researcher. TCAAT student outcomes were prepared considering the MoNE 2019 8th grade Turkish Course Curriculum. To prepare this test, questions were used from the Outcome Comprehension Tests on the subject ("Elements of the Sentence") as prepared by the MoNE General Directorate of Measurement, Assessment, and Exam Services between 2013 and 2017 to be used by 8th graders in Support and Training Courses. The purpose for choosing questions from these Outcome Comprehension Test was that they include standardized questions and are used throughout the country. The Outcome Comprehension Tests were copied and given to two field experts working at the same school as the researcher and who had taught the 8th grade in the previous academic year. The experts were asked to choose 25 questions from among 61 questions. The researcher, who is also a field expert, also chose 25 questions and a draft of the 20-question Achievement Test was created together with the two field experts.

In order to ensure the content and appearance validity of the test, the Achievement Test draft was presented to the experts again and the test was finalized in line with the expert opinion. According to Büyüköztürk (2018: 180-181), content validity indicates the adequacy of the test items of a test in evaluating the behavior to be measured, while appearance validity refers to the validity of factors such as the name, questions, and order of the test, and both validity types can be evaluated with expert opinion.

In order to calculate the reliability of the Turkish Course Academic Achievement Test, the internal consistency methods KR-20, KR-21 and Cronbach Alpha methods were utilized. Due to the fact that the subject whose outcomes to be measured had not been covered in the school in previous years, the 8th grade students who were educated at the school in the previous academic year went to different higher education institutions as graduates, and these schools contain heterogeneous groups, the curriculum of the control and experimental group classes and the other existing classes work on the same timetable, the decision was made to calculate the reliability of the test using the Cronbach Alpha coefficient instead of KR-20 and KR-21.

According to Bademci (2011), the general acceptance of the Cronbach Alpha coefficient for use in weighted measured items only is incorrect, as it can be used for the reliability of measurements for items with bivalent (0-1) values. In this case, the reliability results of the measurements obtained from a two-value measured test will give results identical to the KR-20. Özmen (2014: 70-72) determined the reliability of the multiple-choice test with a Cronbach Alpha value of 0.83 and stated that the test was reliable. In the literature, there are studies in which the Cronbach Alpha internal consistency coefficient is used in the calculation of reliability in experimentally designed studies conducted (Gürbüz & Engin, 2014). The Cronbach Alpha reliability coefficient of the Turkish Course Academic Achievement Test developed by the researcher was calculated and determined as 0.72. According to Yılmaz and Sünbül (2009), the Cronbach Alpha has a coefficient value between 0 and 1 and the closer this number is to 1, the higher the reliability of the scale. Büyüköztürk (2018: 183) also stated that a reliability coefficient of 0.70 and above is generally sufficient for reliability.

Attitude Scale Towards Turkish Lessons

In this study, the validity and reliability of the "Attitude Scale Towards Turkish Lessons" (ASTTL) developed by Topçuoğlu Ünal and Kaya (2014) was used. In the internal consistency study conducted by the researchers who developed the scale, the Cronbach Alpha Internal Consistency

coefficient was found to be 0.915. In this case, it is possible to say that the items that make up the scale are consistent with each other and reflect the attitude they want to measure (Topçuoğlu Ünal & Kaya, 2014). In the reliability study conducted in this research, the Cronbach Alpha internal reliability coefficient of the scale was calculated as 0.888. The scale consists of a total of 27 items, 19 of which are positive and 8 negative. The scale items were rated using a 5-point Likert as strongly disagree (1), disagree (2), undecided (3), agree (4), completely agree (5). All items (6, 13, 18, 25, 30, 35, 38, 40) in the negative attitudes towards the lesson dimension of the Turkish course attitude scale were analyzed by reverse coding because they contain negative judgments.

Data Analysis

The TCAAT and ASTTL were administered as pre-test and post-test to a total of 110 students, including the experimental and control groups. The data obtained were analyzed using the SPSS 22 package program. The mean, standard deviation, and frequency values of the groups were analyzed using descriptive statistics. In order to check whether there was a statistically significant difference between the pre-test and post-test scores of the experimental and control groups, an independent sample t-test was conducted. The normality of the groups required for the t test was tested and it was found to be normal.

Ethics Committee Permission

Data collection tools were presented to the Kahramanmaraş Sütçü İmam University Ethics Committee and it was decided that the study was in accordance with research and publication ethics (Rectorate of Kahramanmaraş Sütçü İmam University Social and Humanities Ethics Committee, E50052, December 12, 2019).

FINDINGS

In this section, the findings obtained from the research are given in order according to the aims of the research.

Findings Regarding the TCAAT Levels of 8th Grade Students According to the Method Variable Used

Pre-TCAAT was applied to both groups before starting the application in order to check the equality of prior knowledge in both groups of students related to “Elements of the Sentence”. Before analysis, the data were tested to ensure they were suitable for parametric tests. Independent groups t-test results for the analysis of the scores the students achieved on the Pre-TCAAT are given in Table 1.

Table 1. Independent Groups t-Test Results Related to Pre-TCAAT Scores of Students in Experimental and Control Groups

Groups	Independent variable/ Method	Dependent variable /Test	N	\bar{X}	Ss	Sd	t	P
Experimental group	5E Learning Model Suitable for Techno Pedagogical Lesson Plan	Pre-TCAAT	56	5.01	1.93	108	-1.23	0.219
Control Group	The Method Defined by the Turkish Course Curriculum	Pre-TCAAT	54	4.57	1.19			

As indicated by Table 1, the average of the Pre-TCAAT scores of the students in the experimental group is 5.01 and standard deviation is 1.93, while the average of the Pre-TCAAT scores of the students in the control group is 4.57 and standard deviation is 1.191 however, no significant difference was found between the achievement levels of the students ($t(108) = -1.23, p > .05$). Since there is no significant difference, it can be said that the preliminary knowledge of both groups about

the subject matter is similar. To see the effect of the independent variable, it is sufficient to look at the post-tests performed after the application of both groups.

Table 2. Independent Samples t-Test Results Related to the Post-TCAAT Scores of Students in the Experimental and Control Groups

Groups	Independent Variable/Method	Dependent Variable /Test	N	\bar{X}	Ss	Sd	t	P
Experimental Group	5E Learning Model Suitable for Techno Pedagogical Lesson Plan	Post-TCAAT	56	9.25	4.19	108	-4,62	0.000
Control Group	The Method Defined by the Turkish Course Curriculum	Post-TCAAT	54	6.17	2.65			

As shown in Table 2, the average of the Post-TCAAT scores of the students in the experimental group is 9.25, while the average of the Post-TCAAT scores of the students in the control group is 6.17, with a standard deviation is 2.65.

In this case, the independent groups t-test indicated a significant difference between the achievement levels of the students. This difference is in favor of the experimental group in which the 5E learning model designed in accordance with the techno pedagogical lesson plan was applied ($t(108) = -4.62, p < .05$). It can be concluded that the 5E learning model was more effective than the methods defined by the Turkish course curriculum in increasing the success of the course.

Table 3. The Related Samples of t-Test Results of the Mean of Pre-TCAAT and Post-TCAAT Scores of the Students in the Control Group

Group	Method	Test	N	\bar{X}	Ss	Sd	t	P
Control Group	The Method Defined by the Turkish Course Curriculum	Pre-TCAAT	54	4.57	1.81	107	-3.63	0.000
		Post-TCAAT	54	6.16	2.65			

Table 3 illustrates that the pre-TCAAT average of the students in the control group is 4.57 with a standard deviation of 1.81, while the post-TCAAT average score is 6.16 with a standard deviation of 2.65. As a result of the related sample t-test, there is a statistically significant difference between the mean scores of the students' pre-test and post-test with $p = 0.00$. This difference is in favor of post-tests ($t(107): -3.63, p < 0.05$). The Turkish course academic achievement of the students in the control group significantly changed after the method prescribed by the Turkish Course Curriculum was applied.

Table 4. The Related Samples of t-Test Results of the Experimental Group Students' Pre- and Post-TCAAT Scores Mean

Group	Method	Test	N	\bar{X}	Ss	Sd	t	P
Experimental Group	5E Learning Model Suitable for Techno Pedagogical Lesson Plan	Pre-TCAAT	56	5.01	1.93	111	-6.85	0.000
		Post-TCAAT	56	9.25	4.19			

As seen in Table 4, the average of the Pre-TCAAT of the students in the experimental group is 5.01 with a standard deviation of 1.93, while the Post-TCAAT average is 9.25 with a standard deviation of 4.19. There is a statistically significant difference between the pre-test and post-test mean scores of the students since $p = 0.00$ ($t(111): -6.85, p < 0.05$). The success points of the students in the experimental group in the Turkish lesson changed in a positive way after applying the 5E learning model designed in accordance with the techno pedagogical lesson plan.

In increasing the success of Turkish lessons, both the 5E learning model designed applied in the experimental group and the method defined by the Turkish lesson teaching program in the control

group significantly increased the success of Turkish lessons in a positive way. When the experimental and control groups are compared, there was a significant difference in favor of the experimental group in increasing the success of Turkish lessons.

Findings Regarding the Turkish Course Attitude Levels of 8th Grade Students According to the Method Variable Used

In order to determine the attitude levels of the students in the experimental and control groups towards the Turkish course, the ASTTL was administered to both groups before starting the application. Before analysis, the data were tested to ensure they were suitable for parametric tests. The results of the independent groups t-test conducted for the analysis of the scores the students achieved on the pre-ASTTL are given in Table 5.

Table 5. Independent Groups t-Test Results Related to Pre-ASTTL Scores of Students in Experimental and Control Groups

Groups	Independent Variable/Method	Dependent Variable/Test	N	\bar{X}	Ss	Sd	t	P
Experimental Group	5E Learning Model Suitable for Techno Pedagogical Lesson Plan	Pre-ASTTL	56	102.17	16.37	108	-0.958	0.340
Control Group	The Method Defined by the Turkish Language Curriculum	Pre- ASTTL	54	98.68	21.62			

Table 5 demonstrates that the average of the pre-ASTTL scores of the students in the experimental group is 102.17 with a standard deviation of 16.37, while the standard deviation of the pre-ASTTL scores of the students in the control group is 21.62. No significant difference was found between the attitude levels of the students. ($t(108) = -0.958, p > .05$), thus it can be concluded that the attitude levels of both groups towards Turkish lessons are similar. To see the effect of the independent variable, it is sufficient to look at the post-tests performed after the application of both groups.

Table 6. Independent Samples t-Test Results Related to Post-ASTTL Scores of Students in Experimental and Control Groups

Groups	Independent Variable/Method	Dependent Variable/Test	N	\bar{X}	S	Sd	t	P
Experimental Group	5E Learning Model Suitable for Techno Pedagogical Lesson Plan	Post-ASTTL	56	103.64	13.92	108	-0.420	0.676
Control Group	The Method Defined by the Turkish Language Curriculum	Post-ASTTL	54	102.38	17.23			

As Table 6 indicates, the average of the post-ASTTL scores of the students in the experimental group is 103.64 with a standard deviation of 13.92, while the average of the post-ASTTL scores of the students in the control group is 102.38 with a standard deviation of 17.23. No significant difference was found between the attitude levels of the students as a result of the independent groups t-test conducted to determine whether the difference between the mean scores of the students in the experimental and control groups was significant ($t(108) = -0.420, p > .05$). Attitude post-test scores of the students in the experimental and control groups towards Turkish lesson were similar.

DISCUSSION AND CONCLUSION

As a result of the research, it was revealed that the 5E learning model designed in accordance with the techno pedagogical lesson plan applied in the experimental group on the subject of "Elements

of the Sentence" included in the 8th grade Turkish course curriculum was more effective in increasing academic achievement than the methods defined by the Turkish course curriculum applied in the control group. A statistically significant difference was found in favor of the experimental group between the average achievement scores of the students in the experimental group and the average scores of the students in the control group. This result may be due to the technology used actively within the scope of the techno pedagogical lesson plan, as well as the application of the 5E learning model. In addition, integrating both together may make the application more effective and made a positive contribution to the increase of student success. When the literature is examined, there are studies showing that students taught with the 5E learning model are more successful than students taught with the methods defined by the Turkish Language Teaching Program (Bayram, 2015). In addition, Özcan's (2015) examined the effects of animation-supported 5E learning methods on student achievement, attitudes, and opinions towards the lesson in teaching the subject "Declaration and Wish Modes" in 7th grade Turkish lessons and concluded that animation-enriched 5E learning methods had a higher effect on student achievement compared to the current program. This result may be considered normal in the study since the 5E learning model designed in accordance with the techno pedagogical lesson plan combining technology and 5E learning model was applied in the experimental group in this study.

The Turkish lesson success scores of the students in the experimental group increased significantly after applying the 5E learning model. Research in the area of using technology in classroom teaching has shown that it increases the success of the students in the lessons by saving time (Ovalı, 2011), creates a sense of curiosity in students (Özbal, 2017), makes the lessons fun and efficient (Tayfa, 2018), and increases student participation in the lesson (Durukan, 2011; Gezer, 2020; Özipek, 2019). The active use of technology in this study may have led to the increase of student success. In addition, there are studies in the literature that show that teaching with the 5E learning model increases the success of students (Gül, 2011; Kara, 2018; Keskin, 2019). This is an expected result considering that the 5E learning model applied in accordance with the techno pedagogical lesson plan combines technology and 5E learning models while the lessons are being taught in the experimental group. Unlike the present study, Öner's (2015) study investigated the effect of an animation-supported 5E model application on student academic achievement and motivation, and found no significant difference between the pre-test/post-test scores of the experimental group and the pre-test/post-test scores of the experimental and control groups. In addition, while there was a significant difference between the pre-test/post-test scores of the experimental group in the 5E learning model supported by animation in the research of Akaydın (2016), no significant difference was found between the experimental group and the control group in terms of increasing academic success. This may be because the application was not the same. Although the technology used in the 5E learning model was supported by animation, it did not seem appropriate to consider it a technology integration model in education. Since both studies differ in terms of application, it may be accepted that the results are different.

In the present research, there is a statistically significant difference between the average of the pre-TCAAT scores of the students in the control group and the average of the post-TCAAT scores. This difference is in favor of the final tests. The Turkish course academic achievement of the students in the control group significantly changed after the methods described by the Turkish course curriculum were applied. This result of the research can be seen as an expected situation because with the application, student knowledge about the subject increased. There are studies supporting this result of the research in the literature (Bayram, 2015; Durukan, 2011; Özcan, 2015; Urfalı Dadandı, 2016; Tayfa, 2018). According to the research of Gezer (2020), it was concluded that teaching in the control group with the methods described by the program did not significantly affect the academic success of the students.

In another result of this study, no statistically significant difference was found between the average attitude scores of the students in the experimental group towards the Turkish course and those of the students in the control group. It was observed that the average attitude scores of the students in

the experimental groups and the control group students were similar. According to this result, it can be said that the application made in both groups had a similar effect on the attitude of the students.

A further result of this research was that there is no statistically significant difference between the average of pre-ASTTL scores of the students in the experimental group and the average of post-ASTTL scores. The Turkish lesson attitude scores of the students in the experimental group did not differ significantly after the 5E learning model designed in accordance with the techno pedagogical lesson plan was applied, thus it can be concluded that the 5E learning model did not significantly affect student attitudes. The reason for this may be that it is difficult for students to change their attitude towards Turkish lessons in a short period of 7 weeks (Tayfa, 2018), and the similarity of life in Turkish lessons before the implementation (Özipek, 2019). Urfalı Dadandı (2016) examined the effect of using electronic textbooks in teaching Turkish on success, self-efficacy, beliefs, and attitude, and while the Turkish attitude score of the experimental group increased compared to the pre-test, this increase was not statistically significant. In contrast to this research, Bayram and Özcan's (2015) 5E learning model (Durukan, 2011; Gezer, 2020; Ovalı, 2011; Özbal, 2017) found that the use of technology significantly increased the attitude score towards Turkish course in the experimental group. The reason for the different results of this research may be due to the application, the sample, the lesson, and the practitioner.

In the present study, no statistically significant difference was found between the average pre-ASTTL scores of the students in the control group and the average post-ASTTL scores. The student attitude towards Turkish lessons in the control group did not differ significantly after applying the methods described by the Turkish lesson curriculum. This may be due to the fact that the students were taught with a similar instructional method before the research began meaning that no application was made to change their attitudes. The attitude levels of the students were found to be high. There are studies supporting this result of the research in the literature (Özipek, 2019; Tayfa, 2018; Urfalı Dadandı, 2016).

Finally, this research revealed that the 5E learning model designed in accordance with a techno pedagogical lesson plan on the subject of "Elements of the Sentence" included in the 8th grade Turkish course curriculum is more effective in increasing academic achievement than the methods described by the Turkish course curriculum. However, it was observed that it was not significantly effective in changing student attitudes towards the Turkish course in a positive way. The following suggestions can be made as a result of this research:

- The 5E learning model designed in accordance with a techno pedagogical lesson plan can be applied in the teaching of other subjects in the Turkish lesson curriculum as well as in subjects from different lessons.
- The effect of the approach used in this study on academic achievement in other courses can be measured.
- This research is limited to a secondary school in the Onikişubat district of the province of Kahramanmaraş. More comprehensive research can be done in terms of sampling.
- By designing a teaching process based on the techno pedagogical lesson plan to be prepared on the basis of different learning models, the results obtained from studies to be conducted can be compared with the results of this research.
- Descriptive analysis may be done about the learning method and learning-teaching processes by taking student opinions.
- In the research, it was concluded that the 5E learning model, which was designed in accordance with a techno pedagogical lesson plan, did not change the attitude of the

students about the "Elements of the Sentence" in the 8th grade Turkish course curriculum. The causes of this result may be studied.

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