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Effect of eTwinning Supported Science Course on Elementary School Students' Attitudes towards Science Course

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Abstract

The aim of this study is to investigate the effect of eTwinning on students' attitudes towards science course which is Web 2.0 supported. Study was carried out in the 2020-2021 academic year. The study was conducted with 5,6 and 7th grade students studying in secondary schools from different provinces of Turkey and Shusha of Azerbaijan. The study group consisted of a total of 50 students of whom were 21 boys and 29 girls. The study group of the research consisted of students participating in the e-Twinning project and the sample was determined by random sample selection. The study took a total of 5 months. Pretest-posttest single-group pre-experimental design was used in the study. In the research, descriptive analysis was performed and Paired-Sample t-Test was used in the arithmetic mean, standard deviation, frequency and statistical analysis part. As a result of the analysis, it was determined that Web 2.0 supported science teaching increased students' attitudes towards science lesson in a positive way.

Keywords: Course attitude, Elementary school, eTwinning, Science education, Web 2.0

INTRODUCTION

When educational environments and activities are examined, formal and informal, the technological changes and transformations have increased considerably in the recent period. This new situation prompts researchers and teachers in the field of education to prepare learning environments suitable for the needs, demands and learning styles of students who use technology in almost every area of their daily life. On the other hand, this situation has prompted practitioners to search for more diverse activities and methods in which technological materials are included in the classroom environment in order to prepare activities for students to develop their 21st century skills and to make the learning environment more effective (Barnes et al.2007; Chu et al.2011; Hsieh et al., 2011; Prensky, 2001). According to Barnes et al (2007), learners of this period need intrinsically motivated learning competencies, learning-teaching activities that they can interact with, and constructive feedback from various environments in order to experience a meaningful and permanent learning experience since students in the present time have much different thinking and learning styles than in the past. Educational technologies, especially Web 2.0 tools, have been used very actively lately. This situation is

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especially preferred as it allows the emergence of productive and versatile learning environments (Korucu & Sezer, 2016). Digital-based resources include a large amount and variety of applications. A large number of interactive educational environments that can support students' mutual or individual learning are provided by these applications. One of the most up-to-date and functional of these digital materials is Web2.0 tools. Web 2.0 refers to a medium where existing web content can be developed and produced for a much more functional user experience, making the applicability of existing technology simpler, as well as layering up-to-date technological opportunities or interactive applications that can be used in digital environments (Karaman et al., 2008). Web 2.0 tools are learner-centered digital contents that enable interactive applications, mutual data exchange, and cooperative studies (Yağmur, Mıcık, 2011).

One of the reasons why Web 2.0 tools have become popular in the education community is that learners can easily access digital data and use the contents in different channels by arranging them as they wish. Blog pages, digital diaries, concept maps, animation and video editing, digital exhibition and board applications, poster and presentation preparation tools, poster and e-book preparation activities are among the tools used in formal and informal environments recently. According to Benzer (2017), Web2.0 tools are evaluated in nine different groups in terms of application topics:

1. Creating a mind map and concept map (Wisemapping, Poppet, SpiderScribe, Mindmeister),
2. Creating a concept chart (Aurasma, Padlet, Blendspace, Lino It),
3. Creating posters and comics (Word Art, Canva, Make Beliefs Comix, Toondoo),
4. E-book writing and storytelling (Pixton, Storyjumper, Storyboard That, Storybird),
5. Personal blogging and writing text (Evernote, Trello, Blogger, Tumblr),
6. Designing measuring tools (Flippquiz, Puzzlemaker, Kahoot, Plickers),
7. Preparing presentations (Prezi, Powtoon, Buncee, Emaze),
8. Preparing explanatory posters (Easelly, Visme, Piktochart, Venngage),
9. Virtual classroom exercises (Edmodo, Classdojo, Remind, Beyaz Pano).

The high-accelerated change that has emerged in technology and digital fields has made technological transformation necessary in educational environments. The inclusion of technology in educational environments will be of great benefit in order to enable students to access information with their individual efforts and to construct information with their personal experiences both to increase academic success and to gain 21st century qualifications. In this respect, the integration of Web 2.0 tools into education offers many opportunities such as data sharing, easy access to information, mutual interaction, communication, data storage and sharing, and collaborative content development (Yükseltürk et al. 2017).

Web 2.0 expression is the general name of the tools that enable practitioners to share the content they create and to have the opportunity of interaction and cooperation provided by the online environment. This expression was added to the literature by Tim O'Reilly in 2004 (Horzum, 2010). The use of Web 2.0 tools in educational activities is highly preferred and there are many scientific studies on the effects of these tools on students. When similar studies available in the literature are examined, the following conclusions are reached:

- If Web2.0 tools are included in educational activities, it creates a positive effect on student success (Özenç et al., 2020),
- In the education and training process, the use of Web 2.0 tools, together with the activities planned in sufficient quality, has an effect that increases the proportional dimension of learning (Laru et al., 2012),
- Learners state that the inclusion of Web2.0 tools in the teaching provides high benefits in terms of learning levels (Lim and Newby, 2020),
- It has been determined that the use of gamifying web 2.0 tools in the implementation of educational activities is effective in reducing the anxiety of the students about the lesson (Yavuz et al., 2020),
- Web 2.0 tools function to increase communication and interaction between individuals, teachers apart from the role of teaching the course and providing information (Chitanana, 2020),

In today's conditions, it is not enough for students to simply receive and record the information presented. At the same time, students are expected to be individuals who can research, critically approach the source and accuracy of information, question the information, reach the information by themselves, transfer and interpret the acquired information into different situations. Web2.0 tools take an active role in achieving this goal (Elmas & Geban, 2012). In addition, it can be stated that individuals with learning difficulties can get support from the web2.0 tools in order to benefit more efficiency from the education process.

eTwinning is a national and international platform for pre-school, primary, secondary and high school levels. It is a free-to-use digital platform that enables all students and teachers to come together online and work with an interdisciplinary approach in the digital environment. With this platform, students and teachers can realize the project-based e-learning model with joint projects. The purpose of the eTwinning platform is to enable schools in Europe to develop collaborative projects and keep in touch with each other (Gençtürk Erdem et al. 2021).

The fact that the concept of digital citizenship, which is also included in 21st century skills, has come to the fore to a great extent in recent years, and the use of digital tools is an inseparable part of our lives. Additionally, these digital channels played a savior role in the recent Covid-19 pandemic, social closure and crisis situations. In this direction, it is aimed to examine the effect of Web 2.0 supported science education on secondary school students' attitudes towards science lesson.

METHOD

Research Model

In this study, it was aimed to examine the effect of using Web 2.0 tools in science lessons on student attitude. Pretest-posttest single-group pre-experimental design, which is one of the research designs, was used for this purpose. The model in which observations are made under the control of the researcher for the variables desired to be determined in the context of cause and effect, and the data are produced as a result of this observation, is called an experimental design (Karasar, 2009). The same tests were applied to the students in the research group before and after the research. The research design used in the study is given in Table 1.

Table 1. *Research design*

	Before research	Research period	After research
Study Group	Attitude Scale	Web 2.0 supported teaching	Attitude Scale

Study Group

Students participating in the e-Twinning project were chosen by random selection and formed the study group. The study group of the research consists of 5,6 and 7th grade students studying in secondary schools in the provinces of Turkey (Denizli, İzmir, Balıkesir, Ordu, Ankara, Mersin, Sakarya, Yalova) and Shusha province of Azerbaijan in the 2020-2021 academic year. A total of 50 students, 21 male and 29 female, are included in the research group. The sample group of the research consists of students participating in the e-Twinning project.

Attitude Scale for Science Course

The Attitude Scale for Science Course developed by Keçeci (2014) was used in the research. The Cronbach Alpha reliability coefficient of this scale, which measures students' attitudes towards science lessons, was calculated as 0.90 by the developer of the scale. The Attitude Scale for Science Course used in the research is a five-point Likert type scale. 20 of the expressions in the scale are positive and 11 of them are negative expressions. The scale consists of 31 items and three factors. These factors were grouped by the scale developer as enjoying the science lesson, the curiosity towards the science lesson, and the association of the science lesson with daily life. The scale was applied to the sample group as both a pre-test and a post-test.

Analysis of Data

A minimum of 31 points and a maximum of 155 points can be obtained from the Attitude Scale for Science Course, which measures students' attitudes towards science lessons and which was developed by Keçeci (2014). Scores above 93 from the scale indicate positive attitude. Normality analysis of data was done and since, the significance value was p> .05 as a result of the Kolmogorov-Smirnov test in the study, it was seen that the data showed a normal distribution. For this reason, it was decided to perform parametric analyzes. Paired-Sample t-Test was used to compare the significance difference between the pretest and posttest attitude scores of the research group.

FINDINGS

The arithmetic mean and standard deviation values of the Attitude Scale for Science Course of the research group determined before and after the research are given in Table 2.

Table 2. *Descriptive statistics of attitude scale scores*

Scale		**N**	**X̄**	**SD**
Attitude	Pre-test	50	82,50	19,64
Scale	Post-test	50	127,96	17,95

When Table-3 is examined, it is seen that while the arithmetic mean score of the research group students belonging to the attitude scale was X=82.5 before the research, the arithmetic mean increased to X=127.96 after the research. The analysis of the pretest and posttest attitude

scale scores of the research group was made with the Paired-Sample t-Test and the results are given in Table 3.

Table 3. *Comparison of pre-test and post-test scores*

	N	X̄	S.S.	t	p
Pre-test	50	82,50	2,77	-13,121	,000
Post-test	50	122,96	2,54		

The Paired-Sample t-Test results obtained from Table-3 show that when the attitude pretest-posttest scores of the project group students are compared, it is seen that there is a significant difference between the scores in favor of the posttest scores ($t= -13,121$; $p< 0,05$). In addition, the post-test average of 122.96 out of 155 points indicates that there is a positive increase in attitude. According to the results obtained, it was seen that the attitudes of the students towards the science course increased positively.

DISCUSSION

Education and training environments have moved beyond the school boundaries due to the Covid 19 pandemic. In addition, it is observed that the changing and developing digital resources have an effect on the society and students. Standard methods are insufficient in terms of satisfying the learning styles. Providing visual and audio digital tools, computers and Web2.0 tools in education provides a more dynamic and functional environment (Önder, 2003). In this context, the efficiency and functionality of standard education environments have become questionable in the changing and digitalizing world. The idea of using alternative methods and new technologies in the solution of these problems has become extremely widespread. Countries prefer to use modern techniques instead of traditional methods in solving educational problems. The aforementioned modern approaches are those in which technological materials and tools are used intensively (İşman, 2011). The introduction of computers into the educational environment and the creation of computer-aided learning environments have also allowed Web2.0 tools to play an active role in educational environments. According to the researches, it has been determined that the educational environment supported by computer and Web2.0 tools has positive effect on developing positive attitude of students towards the course and therefore increasing their academic success when compared to standard applications (Tavukçu, 2008). The measurement and analysis of Web 2.0 supported science education on secondary school students' attitudes towards science lesson was conducted with this study. When the findings obtained in the research were examined, it was revealed that the use of Web 2.0 tools developed a positive attitude towards the Science course. It was determined that there was a significant difference between the pre-test attitude and the post-test attitude scores. Similar to our study, Kenanoğlu (2008) also found, a significant difference favor of students who studied with web-based education and training applications.

According to the findings obtained by Biber (2009), it was determined that the supplementary education activities supported by web tools contributed positively to the students' attitudes towards digital tools and computers. Çayırcı (2007) also reached similar results as a result of the studies which revealed that web-based education applications have a positive effect on students' attitudes towards the course and digital tools. Students also

improved their computer proficiency. The results of Ateş (2005)'s research also showed that there is a significant difference in favor of students who underwent computerized education and training studies. They developed more positive attitude scores than the students who used traditional methods. The results of this study are similar to the results of the relevant literature.

There are also studies indicating no effect of web 2.0 tools on students. For example, Karagöz (2010) did not find a significant difference for students who underwent web-based instruction. Attitude levels of control group and experimental group students towards science lesson were approximately the same. In Özkan (2010)'s research, the lesson planned with the support of Web2.0 tools did not make a significant difference on students' attitudes towards science lesson. It was thought that the findings obtained as a result of the research were due to the students' thinking that the science lesson is a difficult lesson, the quality of the science lesson contents of the web-based education environment, the application times of the presented activities, and the effective role of in-class communication in education. In the study of Başaran (2005), it was claimed that web-based education did not make a significant difference in students' attitudes towards science lesson. In addition, it was claimed that web-based education applications could be used as an alternative to traditional education and teaching methods and that this would have a positive effect on the academic achievement of students in science courses.

When we examined the research conducted in terms of Web2.0 tools and reflections from abroad, Bugava & Mirzal (2017) explored the use of the web questionnaire to create an interactive classroom environment. The use of Web 2.0 tools for classroom interaction had positive effect on students' learning experiences. Sendal et al (2008) examined the effects of Web 2.0's in-class application in their study. This study investigated the effectiveness and importance of Web 2.0 Tools at three northeastern US universities. Similar to our study, preliminary information about Web 2.0 tools and their use was obtained by applying a questionnaire to the participants. The results were compared by applying a questionnaire to the participants before and after the lesson. After the implementation of the study, it was concluded that the competence of using Web 2.0 tools increased, the use of Web 2.0 tools developed a positive attitude on the students in terms of the effectiveness of the lesson, and the use of digital arguments was associated with the development of positive attitudes of individuals. Kan (2011) conducted a study on 40 people in Malaysia and examined the effectiveness of an interactively designed course design, which includes interactive and cooperative learning practices, on the subject of physics course. As a result of the study, it was revealed that the students gave positive feedback to the prepared digital-based activities, they developed an idea that the educational environment supported by interactive applications supports the learning process, and digital-based activities developed the students' collaborative and interactive learning skills.

This study was carried out with fifth, sixth and seventh grade students studying in secondary schools in Turkey and Azerbaijan in the 2020-2021 academic year, investigated the effect of science courses supported by web2.0 tools on students' attitude development. As a result of the research, it was seen that there was a significant difference between the results of the pre-test and post-test. Based on this result, it has been concluded that the use of Web 2.0 tools in science course design is effective in developing positive attitudes towards the course.

Conclusion

Considering the research results, the use of Web2.0 tools in the design of science courses has been a factor in developing a positive attitude towards the course by making the course much more fun and engaging for middle school students. In addition, it can be stated that children's ability to use internet-based tools for both entertainment and communication purposes has developed to a great extent, and the use of these tools in lessons has a positive effect in terms of developing positive attitudes. On the other hand, the increase in the digitalization rate of the Covid-19 pandemic process and the fact that daily activities have been moved to digital media are also an important factor in increasing children's interest in Web2.0-supported educational environments.

Considering all these results, the use of Web2.0 tools in the planning of science courses is effective to develop positive attitude towards the course. As a result of this, it can be considered that the use of Web2.0 tools will also have positive effect on science course success.

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