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Güler Göçen Kabaran 
Muğla Sıtkı Koçman University, Turkey

Bilal Duman 
Muğla Sıtkı Koçman University, Turkey

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Güler Göçen Kabaran, Bilal Duman

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Abstract

The general aim of this study is to determine the effects of teaching method based on digital storytelling on students' learning and study strategies. In this study, as one of the true experimental models, pre-test/post-test control group experimental design was used via detachedly selected experiment and control groups. In the study, a teaching method based on digital storytelling was applied for the participant students in experiment group on the other side, the teaching technique based on PowerPoint Presentation was used in control group. According to the results of the data that was analyzed for this study, it was determined that there was a positive effect of digital storytelling on learning and study strategies. It was clarified in this study that digital storytelling succeeded more points on dimensions namely attitude, anxiety, concentration, selecting main ideas and test strategies under the main concept of learning and study strategies than the teaching technique based on PowerPoint Presentations.

Introduction

As considering the nature of learning and teaching, it can be said that developments in historical process lead to different paradigms. In this process, it is seen that technological developments have made a great contribution on materials, strategies, techniques and methods which have been used in education-training. In education-training process, especially in times past, when it is considered that information has been reached to people mainly via written materials, printing press was accepted as one of the most important inventions not just historically but educationally. With the invention of printing press, written works have been reproduced and they have been easily reached the large masses; as a result of it, sharing information has been developed, reaching new information has been seen as easy and information has spread like wildfire. As for these results, printing press is qualified as a significant invention to share knowledge and to get information easily. While the invention of printing press led to age of enlightenment; nowadays, fast moving internet and digital media has led to information explosion. This period of time is called as "information era" thanks to the developments in digital world and it enables to reach information easily and to communicate with other people in a few seconds. In educational fields, also, to transfer of the written works reproduced by printing press into digital media shows the importance of technology in education.

Societies that know how they reach information; how, where and when they use this information is one step ahead (Çelik, 2010). These societies that have done what is necessary in information era have produced and used the technology thanks to information. The societies that use technology effectively can develop and they have

pioneer in technology competition. The developments which are effective in culture, art and economy have been also important in education. Craig and Amernic (2006) stated that there was a transfer from blackboards and paperboards to overhead transparency and PowerPoint Presentations, and there is a clear change on forwarding messages to educational fields in last thirty years in terms of technological developments.

The studies in this field show that PowerPoint presentations are used commonly in higher education institutes (Akdağ & Tok, 2008; Alpan, 2013; Harlin & Brown, 2007; Craig & Amernic, 2006; Roehling & Trent-Brown, 2011; Sadi, Şekerci, Kurban, Topu, Demirel, Tosun et.al. 2008; Yılmazel-Şahin, 2009). Nowadays, many of lessons have been taught as using PowerPoint presentation since it is used easily and technologically. However, just reading information on slides that are presented in PowerPoint program by instructors or academicians leads to decrease of students' interests in these kinds of presentations. Similarly, a number of studies conducted in this filed show that students state their dissatisfaction for this teaching method. When the studies on students' ideas about using PowerPoint presentation by their instructors are examined (Alpan, 2013; Apperson, Laws & Sepansky, 2008; Kvavik, Caruso & Morgan, 2004), it is seen that instructors cannot use PowerPoint presentations effectively in their courses. Teacher-based learning environment, inactive position on students and similarity to classic teaching methods can be seen as the handicaps or limitations of PowerPoint presentations in courses. In some studies, students state that teaching based on PowerPoint presentations is similar to boring courses in which just written materials are read by students and they also import that it is a type of electronic version of classic instructors (Alpan, 2013; Rickman & Grudzinski, 2000).

New digital technologies and multimedia rapidly change the position on how we can learn and teach (Weis, Benmayor, O'Leary & Eynon 2002). As a type of presentation technique, PowerPoint presentations have not also been so different for students and it has begun to be a traditional method day by day. Nowadays, technologic or traditional methods that just aim to transfer information have remained incapable in terms of the quality of education. In these days, the most general aim of education is to train people who have some skills that are identified as 21st century skills. According to Jakes (2006), these skills can be categorized in four main titles as digital literacy, creative thinking, effective communication and high productivity.

Nowadays, especially in abroad, one of the new methods that are commonly used in education is digital storytelling. From preschool education to adult education, digital storytelling has been used in many fields effectively and it has become one of the important methods combining digital world to education. Digital story can be defined as a method in which a storyteller narrates and transfers a story to listeners as using multimedia instruments. The basic point of digital storytelling is narrating a story. Mello (2001) states that storytelling is one of the oldest methods which is used to narrate ideas and images. Condy, Chigona, Gachago and Ivala (2012) sign that storytelling has been in teaching and learning process throughout the history and stories have been helpful for understanding on the basis of a practice. Digital storytelling is a technology application that is well-positioned to take advantage of user-contributed content and to help teachers overcome some of the obstacles to productively using technology in their classrooms (Yigit, 2020). Digital storytelling is a way of presenting traditional stories in digital platforms as using visual and auditory materials. In this way, a digital story combines the ancient art of storytelling with the modern application of technology (Walters, Green, Goldsby &

Parker, 2018). Digital storytelling method has composed of traditional storytelling that is one of the oldest education-teaching methods and technological developments in digital world. In this regard, it can be stated that digital storytelling is a suitable method for constructivist approach and it can be used in education as enhancing traditional stories via visual and auditory elements.

Jakes (2006) indicates that students can use nearly all of the necessary skills in 21st century with the help of digital storytelling process. The studies in this field show that digital storytelling is a method that helps students to improve their problem-solving skills, critical thinking skills, academic achievement and motivation (Hung, Hwang & Huang, 2012; Yang & Wu, 2012). Digital storytelling occurs via a meaningful synthesis of pedagogic knowledge, subject matter knowledge and technologic knowledge. Therefore, the use of this method supplies the acquisition of necessary skills in today's world. Additionally, Arslan (2013) states that students aim to express themselves in the presentation and preparation steps of storytelling, and they also display the way of expressing themselves in a digital story.

Digital storytelling is a method that enables active participation of students in teaching process, makes learning enjoyable and brings an experience directly. In this regard, it is thought that the use of this method can develop the quality of education like any other methods that are identified as active methods in teaching process. Like other methods, it is seen that digital storytelling method should be examined in pre-service education with candidate teachers. Candidate teachers should have competence on the knowledge of methods, techniques and strategies which make their learning process easy, direct their knowledge to help their students and affect their professional lives.

The main aim of this study is to determine the effect of digital storytelling method on students' learning and study strategies. With regard to this main aim, the questions given below are asked:

1. Is there any mean difference between pre-test/post-test scores of experiment group in terms of total and sub-dimensions of learning and study strategies?
2. Is there any mean difference between pre-test/post-test scores of control group in terms of total and sub-dimensions of learning and study strategies?
3. Is there any mean difference on the post-test scores between experiment and control groups in terms of total and sub-dimensions of learning and study strategies?

Method

Research Model

In this study, as one of the true experimental models, pre-test/post-test control group experimental design was used via detachedly selected experiment and control groups. In research model that has pre-test/post-test control group, there are two groups; one of them is control group and the other one is experiment group. As before and after the study, two measurements are used (Fraenkel & Wallen, 2009). The tests which have the highest level for scientific value are conducted by real testing models (Karasar, 2012).

Universe and Sampling of the Study

This study was carried out in Muğla Sıtkı Koçman University in 2013-2014 spring-semester, and the participants were selected from two different groups in the Department of Primary School Teaching Education as 2th grade students who have had Technology and Material Design Course. There are 41 students in experiment group and 39 students in control group.

Data Collection Instruments

In this study, Learning and Study Strategies Inventory (LASSI) that was developed by Weinstein, Palmer and Schulte (1987) and tested in Turkish in terms of validity-reliability by Köymen (1994) is used in order to collect data about the candidate teachers' learning and study strategies. Learning and Study Strategies Inventory (LASSI) consists of 77 items and these items are categorized into two main groups as cognitive and affective groups. There are ten main scales in this inventory namely attitude, motivation, anxiety, time management, concentration, information processing, selecting main ideas, study aids, self-testing and test strategies (Köymen, 1994). As for total in LASSI, Cronbach Alpha value was calculated as .88 by Weinstein (1987), .96 by Köymen (1994) and .92 by the researcher. Additionally, Guttman Split-Half reliability co-efficient that is got by Split-Half method was calculated as .91 by the researcher.

Data Analysis

As for the aims of this study, the mean differences between control and experiment groups are examined in terms of pre-test, pre-test/post-test and post-test scores. Kolmogorov-Smirnov Test was used in order to determine the distribution equilibrium in the study. Additionally, Levene's Test for Equality of Variances was examined in order to determine the homogeneity of distribution for the participant groups. As for the normally-distributed positions, independent groups t-test was used to determine the mean difference between control and experiment groups in terms of pre-test scores, and Mann Withney U test was used for non-normally distributed cases. In normally-distributed data, dependent groups t-test was used in order to determine the mean difference in control and experiment groups in terms of pre-test/post-test scores, and Wilcoxon Signed Rank Test was used in the same case for non-normally distributed positions. The mean level is accepted as .05 as statistically.

Findings

Findings for the First Sub-problem of the Study

According to normality and homogeneity, with the total scale, dependent groups t-test that is one of the parametric tests was used for motivation, anxiety, concentration, information processing and self-testing; however, Wilcoxon Signed Rank Test test that is one of the non-parametric tests was used for attitude, time management, selecting main ideas, study aids and test strategies. The related analyses were stated in Table 1 and Table 2.

Table 1. t-Test Results for LASSI Pre-Test/Post-Test Scores of Experiment Group

Dimension	Type of Score	N	\bar{X}	Ss	Sd	t	p
Total Scale	Pre-test	41	268.22	25.98	40	-2.291	.027
	Post-test	41	276.05	26.24			
Motivation	Pre-test	41	26.76	5.15	40	.348	.729
	Post-test	41	27.56	4.74			
Anxiety	Pre-test	41	27.46	4.84	40	-1.812	.078
	Post-test	41	28.68	4.15			
Concentration	Pre-test	41	26.80	5.17	40	-1.593	.119
	Post-test	41	27.80	4.85			
Information Processing	Pre-test	41	29.98	3.46	40	-1.408	.167
	Post-test	41	30.90	4.25			
Self-Testing	Pre-test	41	27.37	4.71	40	-.385	.703
	Post-test	41	27.63	5.24			

When Table 1 is examined, it was seen that there is a mean difference between pre-test/post-test results of experiment group in total scale, however there is no mean difference in terms of motivation, anxiety, concentration, information processing and self-testing. It is seen in Table 1 that the general score of post-test is higher than the score of pre-test in experiment group.

Table 2. Wilcoxon Signed Rank Test Results for LASSI Pre-Test/Post-Test of Experiment Group

Dimension	Post-test – Pre-test	N	Rank Average	Total Rank	z	p
Attitude	Negative Rank	7	15.00	105.00	-3.985	.000
	Positive Rank	32	21.09	675.00		
	Equal	2				
Time Management	Negative Rank	22	20.93	460.50	-1.652	.099
	Positive Rank	15	16.17	242.50		
	Equal	4				
Selecting Main Ideas	Negative Rank	13	15.12	196.50	-1.960	.050
	Positive Rank	22	19.70	433.50		
	Equal	6				
Study Aids	Negative Rank	16	19.13	306.00	-1.177	.239
	Positive Rank	23	20.61	474.00		
	Equal	2				
Test Strategies	Negative Rank	17	15.59	265.00	-1.071	.284
	Positive Rank	19	21.11	401.00		
	Equal	5				

When Table 2 is examined, it was seen that there is a mean difference between pre-test/post-test results of experiment group in terms of attitude and selecting main ideas, however there is no mean difference in terms of

time management, study aids and test strategies. It is seen that the average scores of post-test results in the sub-dimensions namely attitude and selecting main ideas are higher than the average scores of pre-test results in the experiment group.

Findings for the Second Sub-problem of the Study

According to normality and homogeneity, with the total scale, dependent groups t-test that is one of the parametric tests was used for attitude, motivation, time management, anxiety, concentration, information processing, study aids and test strategies; however, Wilcoxon Signed Rank Test that is one of the non-parametric tests was used for selecting main ideas and self-testing. The related analyses were stated in Table 3 and Table 4.

Table 3. t-Test Results for LASSI Pre-Test/Post-Test Scores of Control Group

Dimensions	Type of Score	N	\bar{X}	Ss	Sd	t	p
Total Scale	Pre-test	41	256.54	37.65	38	-.309	.759
	Post-test	41	258.13	26.32			
Attitude	Pre-test	41	27.72	4.36	38	-2.303	.027
	Post-test	41	29.41	4.27			
Motivation	Pre-test	41	25.44	5.88	38	-.250	.804
	Post-test	41	25.69	4.46			
Time Management	Pre-test	41	24.00	6.16	38	.769	.447
	Post-test	41	23.26	5.17			
Anxiety	Pre-test	41	26.51	4.91	38	1.094	.281
	Post-test	41	25.64	4.78			
Concentration	Pre-test	41	24.85	6.77	38	.224	.824
	Post-test	41	24.64	5.19			
Information Processing	Pre-test	41	28.31	4.68	38	-1.700	.097
	Post-test	41	29.49	4.01			
Study Aids	Pre-test	41	27.05	4.69	38	-1.261	.215
	Post-test	41	28.03	3.87			
Test Strategies	Pre-test	41	27.15	4.29	38	1.722	.093
	Post-test	41	26.21	4.21			

When Table 3 is examined, it was seen that there is a mean difference between pre-test/post-test results of control group in the sub-dimension namely attitude, however there is no mean difference in terms of total scale, motivation, time management, anxiety, concentration, information processing, study aids and test strategies. It is seen that the average score of post-test results in the sub-dimension namely attitude is higher than the average scores of pre-test results in the control group.

When Table 4 is examined, it was seen that there is no mean difference between the pre-test and post-test scores

in terms of selecting main ideas and self-testing in the control group.

Table 4. Wilcoxon signed Rank Test Results for LASSI Pre-Test/Post-Test of Control Group

Dimensions	Post-test- Pre-test	N	Rank Average	Total Rank	z	p
Selecting Main Ideas	Negative Rank	21	16.79	352.50	-1.301	.193
	Positive Rank	12	17.38	208.50		
	Equal	6				
Self-testing	Negative Rank	17	16.35	278.00	-.405	.964
	Positive Rank	16	17.69	283.00		
	Equal	6				

Findings for the Third Sub-problem of the Study

According to normality and homogeneity, with the total scale, independent groups t-test that is one of the parametric tests was used for attitude, motivation, time management, anxiety, concentration, information processing and self-testing; however, Mann Whitney U test that is one of the non-parametric tests was used for selecting main ideas, study aids and test strategies. The related analyses were stated in Table 5 and Table 6.

Table 5. t-Test Results of Control and Experiment Groups in LASSI Post-Test

Dimensions	Groups	N	\bar{X}	Ss	Sd	t	p
Attitude	Experiment	41	32.41	3.92	78	3.281	.002
	Control	39	29.41	4.27			
Motivation	Experiment	41	26.56	4.74	78	.844	.401
	Control	39	25.69	4.46			
Time Management	Experiment	41	34.32	4.42	78	.988	.326
	Control	39	23.26	5.17			
Anxiety	Experiment	41	28.68	4.15	78	3.045	.003
	Control	39	25.64	4.78			
Concentration	Experiment	41	27.80	4.85	78	2.818	.006
	Control	39	24.64	5.19			
Information Processing	Experiment	41	30.90	4.25	78	1.530	.130
	Control	39	29.49	4.01			
Self-Testing	Experiment	41	27.63	5.24	78	.752	.454
	Control	39	26.87	3.64			

When Table 5 is examined, it was seen that there is a mean difference between control and experiment groups' post-test scores in terms of attitude, anxiety and concentration; however, there is no mean difference between the control and experiment groups' post-test results in terms of motivation, time management, information processing and self-testing. In Table 5, it is seen that the experiment group's average scores of post-test results in the sub-dimensions namely attitude, anxiety, concentration are higher than the control group's average scores

of post-test results in the same sub-dimensions. It means there is a mean difference on attitude, anxiety and concentration sub-dimensions of LASSI on behalf of experiment group.

Table 6. Mann Whitney U Results of Control and Experiment Groups in LASSI Post-Test

Dimensions	Groups	N	Rank Average	Rank Total	U	p
Total Scale	Experiment	41	47.89	1963.50	496.500	.004
	Control	39	32.73	1276.50		
Selecting Main Ideas	Experiment	41	45.70	1873.50	586.500	.039
	Control	39	35.04	1366.50		
Study Aids	Experiment	41	44.68	1832.00	628.000	.098
	Control	39	36.10	1408.00		
Test Strategies	Experiment	41	46.66	1913.00	547.000	.015
	Control	39	34.03	1327.00		

When Table 6 is examined, it was seen that there is a mean difference between control and experiment groups' post-test scores in terms of total scale, selecting main ideas and test strategies; however, there is no mean difference between the control and experiment groups' post-test results in terms of study aids. In Table 6, it is seen that the experiment group's average scores of post-test results in total scale and the sub-dimensions namely selecting main ideas and test strategies are higher than the control group's average scores of post-test results in the same dimensions. It means there is a mean difference on total scale, selecting main ideas and test strategies dimensions of LASSI on behalf of experiment group.

Discussion and Conclusion

It is determined that there is mean difference in pre-test / post-test results of experiment group for total scale; however, it is stated that there is no mean difference on the sub-dimensions namely motivation, anxiety, concentration, information processing and self-testing. According to the results, the learning and study strategies total scores of the students in experiment group in which digital storytelling has been used as a teaching method have increased at the end of the experimental process. In a study conducted by Demirer (2013), it was concluded that learning strategies used by students have been affected by digital storytelling method and the score of using learning strategies has increased via digital storytelling method in courses. This finding is parallel to the results of this study. As for the reason of this increase on the use of learning strategies, it can be thought that this method can give a chance to students to use suitable strategies for their own learning process. In the process of preparing and presenting digital story, student use different ways for the aim of both realizing their own learning and producing an original product. For the reason of this situation, it can be said that the learning and study strategies of students are improved thanks to getting active role in the process. Digital storytelling let learners to collaborate, share, focus on knowledge, create, design and present. Learning happens as a result of this interaction and challenges which learners encountered help them to learn more as problem solvers (Yigit, 2020).

At the end of the digital storytelling process, it is seen that there is no mean difference on the sub-dimensions of

learning and study strategies namely motivation, anxiety, concentration, information processing and self-testing. As for the reason of this result, it can be thought that students have seen this method for the first time and also they have not got enough time to adapt this new method. Gürer (2020) stated that pre-service teachers they complained that digital storytelling required too much time and effort, and sophisticated information and communication technology skills. Besides, as for another reason for this result, it can be thought that the main aim of the study is to examine the effect of digital storytelling on the use of learning and study strategies of students and there has not been any specific study to improve learning and study strategies in the study.

In the experiment group's pre-test/post-test results of LASSI, it is seen that there is a mean difference on the scores of attitudes and selecting main ideas; however, there is no mean difference on time management, study aids and test strategies. According to the results, the scores of the students' in the experiment group have increased in terms of attitude and selecting main ideas at the end of the study. In the related literature, there have been a number of studies which support the idea that digital storytelling improves the attitudes of students on courses (Demirer, 2013; Hung et.al., 2012; Yang & Wu, 2012; Yoon, 2013). It can be said that the excitement on waiting new digital stories for each new week and having enjoyable course instead of boring ones can affect students' attitudes positively. As a result of the digital storytelling method, the students' score was increased in the use of selecting main idea strategy. As for the reason of this result, it can be shown that the main ideas of digital stories were discussed in a limited time in the courses with the help of this method. Sadık (2008) stated that students have had a chance to prepare deeply-meaningful stories thanks to digital storytelling method. The students were directed on not using details or unnecessary information in their digital storytelling preparation process. This process enabled them to determine the main points of their stories and to prepare the stories in this scope. Similarly, it can be thought that students' struggle for discovering the perspective and striking question in a story during the presentation of digital storytelling can affect the use of selecting main ideas a learning strategy.

At the end of the digital storytelling process, it is seen that there is no mean difference on the sub-dimensions of learning and study strategies namely time management, study aids and test strategies. As for the reason of this result, it can be said that digital storytelling requires a process and students can lose their concentration and motivation while preparing digital stories because of the time problems. Ohler (2008) and Robin (2006) state that digital storytelling process takes a long time and, in this process, students should have an opportunity to try it one more time. In the study conducted by Demirer (2013), there is also not a mean difference between the use of digital storytelling and organizing time /study environment strategies for the students. It can be shown as a reason for this result that student were wanted to prepare a digital story for each week and they had a heavily loaded program because of the homework, exams and responsibilities for other courses during that process.

In the control group's pre-test/post-test results of LASSI, it is seen that there is a mean difference on the scores of attitudes; however, there is not a mean difference on the total scale, motivation, time management, anxiety, concentration, information processing, study aids and test strategies. According to the results, the score of the students in the control group in which PowerPoint presentation-based teaching method was used was higher at the end of the study in terms of the sub-dimension namely attitude. In some studies, it is stated that the use of

PowerPoint presentations have a positive effect on the student (Baker, Goodboya, Bowmana and Wrightb, 2018; Susskind, 2005). This finding supports the results of this study. It can be thought that the support of teaching via visual elements in PowerPoint presentations and the preparation process for students can affect students' attitudes positively.

At the end of the PowerPoint presentation-based teaching process, it is seen that there is no any mean difference between the students' learning and study strategies and the total scale, motivation, time management, anxiety, concentration, information processing, study aids and test strategies. As considering this result, it can be stated that PowerPoint presentation-based teaching method is not so effective on students' learning and study strategies. In the research conducted by Baker, Goodboya, Bowmana and Wrightb (2018), it was determined that PowerPoint has no effect on learning. As for the reasons of this result, it can be said that this kind of teaching method does not require so much preparation and thinking skills for students, and necessary information in this course can added into slides just using internet or books.

As for control group, it is seen at the end of the study that there is no mean difference between the pre-test/post/test results of LASSI for selecting main ideas and self-testing dimensions. According to this result, it can be said that the score of the students in the control group in which PowerPoint presentation-based teaching method did not change at the end of the study in terms of selecting main ideas and self-testing dimensions. Selecting main ideas requires students' ability to select important information (Jouhari, Haghani and Changiz, 2016). In PowerPoint presentations, students use information directly in their presentations and they cannot organize it effectively; therefore, it can be said that this method does not contribute students' selecting main ideas strategy. Similarly, these presentations are similar to each other and these cannot present any different elements for students. Since there are not any original products in this method, it can be thought that students think that there is no need to repeat PowerPoint presentations in terms of self-testing.

It is seen that there is a mean difference between the post-test results of the students in both groups and attitude, anxiety and concentration dimensions of LASSI. However, for both groups, there is no mean difference between their post-test results and motivation, time management, information processing and self-testing strategies. According to these results, it is seen that the scores of the students in experiment group are higher than the scores of students' in control group in terms of attitude, anxiety and concentration at the end of the study. As considering this result, it is said that digital storytelling method is more effective than PowerPoint presentations in terms of improving students' attitude positively. In the process of digital storytelling, students can prepare creative, different and original products, and this leads to improve students' attitudes positively in learning and study strategies. When the studies in the related literature are examined, it is seen that digital storytelling affects students' attitudes positively for courses (Ballast, Stephens & Radcliffe, 2008; Demirer, 2013; Figg & McCartney, 2010; Hung et.al., 2012; Salpeter, 2005; Yang & Wu, 2012; Yoon, 2013). It can be a reason for increasing anxiety level of students that digital storytelling requires a serious preparation process and leads to reflect students' own ideas. Ural (2006) states that anxiety can be useful for students' learning process and it can show that students care about their learning. The academic achievement of the students increased at the end of the study and it can show that the anxiety level of the scores were not so high to affect their success negatively.

As for a reason of improving concentration level in the experiment group, it can be said that some elements such as focusing, attention and interest are important for digital storytelling process and these elements are key factors in order to improve concentration.

There is no mean difference between digital storytelling method and PowerPoint presentation-based teaching method in terms of motivation, time management, information processing and self-testing strategies. As for the reason of this result, it can be said that the students in both groups had the courses with the same academicians and all of the participants were also motivated and guided during the process. It can be thought that guided by academicians whenever students want can move ahead of methodological difference between the groups.

It is determined that there is a mean difference between the control and experiment groups' post-test results in terms of total score, selecting main ideas and test strategies; however, there is no mean difference in terms of study aids. According to these results, the scores of the students in experiment group were higher than the students in control group in terms of total score, selecting main ideas and test strategies. As referring these results, it can be said that digital storytelling method is more effective than PowerPoint presentation-based teaching method in terms of some learning and study strategies namely selecting main ideas and test strategies. It can be thought that the use of learning and study strategies, the use of selecting main ideas and test strategies can be improved via preparing stories for each week, organizing story boards and transferring stories into digital form for students.

It is seen that there is no mean difference between digital storytelling method and PowerPoint presentation-based teaching method in terms of study aids. It can be a reason for this result that academicians and instructors supported and guided the students into two groups during study in terms of study aids for their learning. It can be thought that informing and guiding the students while designing both digital stories and PowerPoint presentation in terms of preparing presentation and studying lessons may lead no difference between two groups in this study.

Recommendations

- It is thought that digital storytelling method can be effective in courses since it positively affects the use learning and study strategies by students. It is suggested that educators can use this method in their teaching process.
- It is understood that technology-based methods in which students can be active are necessary in teaching and learning process because at the end of this study, it is seen that digital storytelling is more effective than PowerPoint presentations in terms of learning and study strategies.
- In this study digital storytelling and PowerPoint presentations were compared with regards to learning and study strategies. In further studies, different methods or techniques can be compared to digital storytelling.
- In addition to candidate teachers, digital storytelling method can be studied with in-service teachers and the use of this method actively by in-service teachers can be supplied as in this way.

- This study was conducted only with the scope of related course. The studies based digital storytelling method can be used in other courses via interdisciplinary studies.
- In this study, the students created their stories as groups. There can be an opportunity for designing digital stories individually for each student.

Notes

This research was produced from the thesis named “The effect of digital storytelling method on students' academic achievement and learning and study strategies”

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Author Information

Güler Göçen Kabaran


 <https://orcid.org/0000-0002-2631-8768>

Muğla Sıtkı Koçman University

Turkey

Contact e-mail: gulergocen@mu.edu.tr

Bilal Duman

 <https://orcid.org/0000-0002-1282-8425>

Muğla Sıtkı Koçman University

Turkey