The Effect of Video Magazines on Secondary School Students' Academic Achievement and Digital Technology Attitudes: An Experimental Study

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ABSTRACT

Video magazines can make students' learning experience more effective by adding a different dimension to the learning process. This learning experience can create changes in students' attitudes and behaviors. This study aimed to investigate the impact of video magazines in the experimental group. It printed magazines in the control group on middle school pupils' academic performance and attitudes toward digital technology. The research study group comprises 5th-grade children enrolled in a state-affiliated secondary school in the Arnavutköy district of Istanbul during the academic year 2023-2024. One of the two identical fifth-grade classes at the school was designated as the control group, while the other was given the experimental group. Both the control group and the experimental group consisted of 27 students each. The study employed a quasi-experimental approach and used quantitative analysis protocols. An examination of the accomplishment test revealed a notable disparity in the post-test scores between the experimental and control groups. Consequently, it was concluded that the experimental group received instruction using video magazines and achieved superior scores. Upon analysis of the post-tests of the attitude scale between the experimental and control groups, a notable disparity was observed in the sub-dimensions of "social networks," "instructional technology use," "technology for personal use," and "use for entertainment purposes." The use of video magazines in teaching is of significant importance. The results were deliberated over in relationship to the existing body of knowledge, and recommendations were put forward.

Keywords: *Video magazine, academic achievement, digital technology, attitude*

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INTRODUCTION

Technology makes it possible to share scientific content more easily and quickly, to increase the visuality of scientific content, and make it three-dimensional and interesting (Akbaba & Ertaş Kılıç, 2022). Video journals provide more effective information than traditional journals, facilitate in-depth learning, develop critical thinking, and are versatile educational tools that respond to students' learning needs (Kay, 2012a; Preradovic & Jandrić, 2016). Although there is a limited number of studies in the literature on the use of video journals in education, there are national and international studies using video-supported education and Web 2.0 tools (Almumen, 2023; Corbin Frazier & Eick, 2015; George & Mallery, 2019; Limueco & Prudente, 2020; Lo, Lee, & Tien, 2020; Nasim, Siddiqi, & Shamshir, 2021). The study done by Yıldırım (2018)

investigated the use of mobile augmented reality technology in science courses for middle school students. The findings revealed that this technology had a good impact on student's academic performance and facilitated the process of concretizing abstract notions. These studies in the literature show that digital materials, especially video journals, can improve students' learning experiences and positively impact academic achievement when used in education.

Academic achievement is defined in the literature as the degree of achievement of learning goals determined by exam scores, grade point averages, and other measurement tools to evaluate students' performance in the educational process (York, Gibson, & Rankin, 2015); a multidimensional structure that includes students' cognitive abilities, motivation, learning strategies and environmental factors (Sternberg, 2005; Zimmerman, 2008). In addition, students' intrinsic and extrinsic motivation sources affect their participation in learning processes and their attitudes towards courses (Ryan & Deci, 2000). Learning strategies include students' methods and techniques to increase their academic achievement. Effective learning strategies relate to how students organize, store, and remember information (Pintrich & De Groot, 1990). This shows that in addition to individual factors, environmental factors are also effective in affecting learning strategies for academic achievement. Among these environmental factors, factors such as family support, school environment, quality of teachers, and socioeconomic status shape students' academic performance (Fan & Chen, 2001). In addition to the family, teachers' pedagogical competencies and classroom management skills can also affect students' learning process and academic achievement (Hattie, 2009). Academic achievement is generally a concept shaped by multidimensional factors such as students' cognitive abilities, motivation, learning strategies, and environmental factors. Exam scores and grade point averages evaluate it. Environmental factors such as family support, teacher quality, and socioeconomic status also affect this achievement. According to Duckworth et al. (2007), academic achievement predicts future educational and career success. Therefore, educational policies and programs need to develop various strategies to increase students' academic achievement.

Digital technology enables the organization, storage, and transmission of information and includes devices such as computers, the internet, mobile phones, and cameras (Kalelioğlu, 2013; Coşkun, 2015). Digital technologies also play an effective role in educational environments and determine students' attitudes. Therefore, determining attitudes toward digital technology is important for designing and organizing instructional environments (Gokhale, Brauchle, & Machina, 2013). In the literature, there are various studies investigating the effect of digital technology on individuals' attitudes. Among these studies, studies focusing on teachers' attitudes toward the use of digital technology stand out (Aksoy et al., 2021; Eyuboğlu & Yılmaz, 2018; Sözbilir, 2021). In addition, there are also studies examining the effect of parents' use of digital technology on students' attitudes (İnan Kaya et al., 2018; Türel & Duygu, 2019). In addition, studies on the attitudes of blue and white-collar workers (Hampel & Sassenberg, 2021; İrge & Şen, 2021; Topooco et al., 2017; Wu et al., 2020), managers (Barrutia & Echebarria, 2021), psychology and social workers (Parisi et al., 2021), and physiotherapists (Barton et al., 2022) towards the use of digital technology are also included in the literature. Studies on students' attitudes towards digital technology carry a great weight. Studies in this field have examined the attitudes of primary school (Eroğlu et al., 2018; Unsworth & Mills, 2020), secondary school (Eroğlu et al., 2018), high school (Erten, 2019), nursing (Ramsay et al., 2020), fine arts (Demir & Kılıçkıran, 2018), teaching (Akman, 2021), and education faculty students (Kırmızı et al., 2021) towards the use of digital technology. Studies comparing the attitudes of students studying in different faculties and general undergraduate students towards the use of digital technology are also included in the literature in this field (Arslan, 2020; Hussein et al., 2020; Kırılmaz et al., 2022; Tekeoğlu, 2020; Topaloğlu, 2020; Yıldız et al., 2021). In general, the literature examining the role of digital technologies in education and the attitudes of individuals towards these technologies, especially focusing on teachers, parents, various professional groups, and students at different educational levels, reveals that these attitudes are important for the design and organization of academic environments.

The increasing use of digital technologies in education has the potential to diversify and enrich learning processes. However, the impact of digital content, such as video journals, on students' academic performance and attitudes towards digital technologies has yet to be sufficiently investigated. To fill this gap, this study aims to understand the effects of video journals on students. Video journals can support the

learning process by presenting complex information to students in visual and auditory ways. The findings of this study may help educators use digital tools more effectively and contribute to developing strategies that will positively improve students' attitudes toward digital technologies. In addition, this study is expected to guide future research and practices by revealing the specific effects of integrating digital technologies into learning processes on student achievement and attitudes. These findings are thought to guide the development of educational policies and teaching methods. There is a limited number of studies on using video journals in education, and there needs to be a study comparing video journals with printed journals in the literature on this subject. From this point of view, the study aims to examine the effect of video magazines on students' academic achievement and attitudes towards digital technology. The following research questions were identified in line with the purpose of the study; (i) Does the academic achievement test show a statistically significant disparity between the pretest and posttest scores of the pupils in the experimental and control groups? (ii) Are there statistically significant differences in the pretest and posttest scores of the students in the experimental and control groups on the scale measuring their attitude toward digital technology? (iii) The academic attainment pre-test scores of the experimental and control groups exhibited a statistically significant difference? (iv) Do the post-test academic achievement scores of the experimental and control groups exhibit statistically significant differences? (v) Are there significant differences in the pretest scores of attitudes toward digital technology between the experimental and control groups? (vi)Do the post-test scores of the experimental and control groups demonstrate a statistically significant difference in their attitude toward digital technology?

RESEARCH METHOD

Research Model

The study employed a pretest-posttest control group experimental design and utilized quantitative measurement techniques. Pre-test-post-test control group experimental design is a research design that compares the effect of the intervention by measuring the experimental and control groups beforehand and measuring both groups again after the experimental intervention (Büyüköztürk, 2024; Karasar, 2014). Video magazines prepared by the researchers were used in the experimental group, and TÜBİTAK Science and Children's Magazine was used in the control group. Measurement tools were applied to both groups before and after the experiment, and their effects were analyzed.

Participants

This research study group comprises participants selected using the criterion sampling technique. The criterion sampling method is a method that directs the researcher's sample selection process by using specific criteria. In this way, the researcher can obtain a representative sample that is suitable for the subject of the research, thus increasing the validity and reliability of the results (Büyüköztürk et al., 2022; Yıldırım & Şimşek, 2021). The criteria determined in this study are as follows;

- Being a 5th grade student in secondary school
- Volunteering to participate in the study
- To have high scores in the applied measurement tools
- To have passed the readiness test conducted by the Ministry of National Education

The exclusion criterion was not participating in at least one of the interviews without any excuse. Experimental and control groups were formed in line with these criteria. In the experimental group, 48.12% (n=13) were boys and 51.88% (n=14) were girls. In the control group, 59.26% (n=16) were boys and 40.74% (n=11) were girls.

Data Collection Tool

The study selected topics related to the units appropriate to the current program. The researchers prepared a 20-question multiple-choice “Achievement Test” containing the achievements of these subjects. In addition, the “Attitude Scale Towards Digital Technology” was used.

Demographic Information Form: The researchers prepared this form and included questions on gender, participation status, and current school.

Academic Achievement Test: The researchers identified six topics related to the first and second units of the TUBITAK Science Child Magazine. "Four Astronauts Returned to Space, Hot Peppers Grown in the International Space Station were Harvested, Water Can Be Collected from the Air with Solar Energy, Winter is Here, Get Ready for Sleep, Vitamins, How Do Plants Move?" are the topics determined. A 40-question pilot test was developed by identifying the important points among these six topics. The difficulty and discrimination of the pilot test items were analyzed using the SPSS program. According to the results of the analysis, a 20-question achievement test was developed among the appropriate items. The data set of 80 respondents and 40 items was coded as 1 and 0 to estimate item and test statistics. Difficulty and discrimination indices of the items are presented in Table 1.

Table 1. *Difficulty and Discrimination Index of Items*

Old Article Number	New Article Number	Number of Correct Answers	Total Number of Students	Item Difficulty Index	27% Upper Group	27% Sub-Group	Item Discrimination Index
S1	S1	56	80	0.70	19	12	0.33
S6	S2	52	80	0.65	17	12	0.23
S9	S3	59	80	0.74	20	8	0.57
S10	S4	65	80	0.81	20	14	0.28
S13	S5	47	80	0.59	18	8	0.47
S17	S6	26	80	0.33	10	3	0.36
S18	S7	52	80	0.65	17	11	0.28
S19	S8	71	80	0.89	20	15	0.23
S26	S9	24	80	0.30	10	4	0.28
S27	S10	31	80	0.39	12	5	0.33
S29	S11	37	80	0.46	20	1	0.90
S30	S12	15	80	0.19	8	2	0.28
S31	S13	24	80	0.30	8	2	0.28
S32	S14	16	80	0.20	6	1	0.23
S33	S15	31	80	0.39	13	5	0.38
S34	S16	14	80	0.18	7	1	0.28
S35	S17	53	80	0.66	15	10	0.23
S36	S18	41	80	0.51	14	6	0.38
S37	S19	34	80	0.43	12	3	0.42
S39	S20	28	80	0.35	12	1	0.25
S40	S21	35	80	0.44	12	6	0.28
				Average Difficulty of the Test			0.40

Item discrimination is the power of an item to distinguish between those who know and those who do not know. It is the relationship between an item and the test it is in. To be considered adequately discriminative, an item must elicit correct responses from students in the successful upper group and incorrect responses from students in the unsuccessful lower group. To determine the item discrimination index, the number of accurate replies in the successful 27% upper group is subtracted from the number of correct responses in the unsuccessful 27% lower group. This ratio is then calculated based on the total number of students in each group. The range of values for the discrimination index is from -1 to 1. According to Büyüköztürk (2024), when the item discrimination index approaches 1, it indicates an increase in the discrimination power of the item. Conversely, when the item discrimination index approaches -1, the discriminating power of the item diminishes. For the evaluation of the item discrimination indices in Table 1, Crocker and Algina's (2008) discrimination evaluation limits were used. Accordingly, items with an item discrimination index of 0.40 and above were expressed as perfect. Among the items in the test, items 9, 13, 29, and 37 (Rjx=0.57, 0.47, 0.9, 0.42) can be expressed as perfect items, respectively. Good items were evaluated for items with values between 0.30 and 0.39. Items 1, 17, 27, 33, and 36 (Rjx=0.33, 0.36, 0.33, 0.33, 0.38, 0.38, respectively) can be considered good items. Again, items should be developed for values between 0.20 and 0.29 at the same thresholds. In this test, items 6, 10, 18, 19, 26, 30, 31, 32, 34, 35, 39, and 40, which

have a discrimination index between 0.20 and 0.29, do not have sufficient discrimination and should be revised. Crocker and Algina (2008) interpreted items with an item discrimination index of 0.19 and below as weak items and stated that they should be removed from the test. Accordingly, 19 items in the test were removed from the test. Table 1 shows the item difficulty indices of the items. The item difficulty index takes a value between 0 and 1. It is interpreted as the item becoming more accessible as the index approaches one, and the item becomes more difficult as the index approaches 0 (Baykul & Turgut, 2014; Matlock-Hetzel, 1997). Among the items in Table 1, item 19 is the most straightforward question in the test (Pj=0.89). However, questions 1, 5, 6, 9, 10, and 39 in the test (Pj=0.70, 0.68, 0.65, 0.65, 0.74, 0.81, 0.66, respectively) seem relatively easy. Questions 15, 24, and 38 appear to be the most difficult items in the test, with difficulty indices of 0.05, 0.09, and 0.04, respectively. The item difficulty indices of questions 11, 12, 16, 17, 17, 20, 21, 23, 25, 26, 27, 28, 30, 31, 32, 33 and 34 ranged between 0.10 and 0.39. These questions are relatively difficult. The remaining items with difficulty indices ranging between 0.41 and 0.59 are medium-level. The average difficulty of the test was found to be 0.40. In addition, KR-20 analysis was performed within the scope of the reliability analysis of the achievement test, and it was determined that this reliability coefficient was reliable with .718 (Karagöz, 2017).

Attitude Toward Digital Technology Scale: The scale created by Cabı (2016) was designed to assess secondary school students' attitudes towards digital technology. After doing principal component analysis and varimax rotation, it was concluded that the scale comprised eight independent variables. The Kaiser-Meyer-Olkin (KMO) correlation coefficient was determined to be 0.906, suggesting that the data were appropriate for factor analysis. Furthermore, Bartlett's test of sphericity yielded a significant result (x2=2045, f=689, sd=674, p=.000). The factor structure, which accounted for 54.56 of the total variance, demonstrated a satisfactory level of fit. The Cronbach's Alpha value of the scale was determined to be 0.90, suggesting a remarkable level of internal consistency. A range of 0.61 to 0.86 was seen in Cronbach's Alpha coefficients of the eight factors. A Spearman-Brown two-half test reliability coefficient ranging from 0.60 to 0.83 was estimated. Upon analysis of the item-total correlations, it was seen that the correlation values for 39 items were between the range of 0.31 to 0.73, which were found to be statistically significant. The results indicate that the items exhibit strong discriminative power and contribute to the general reliability of the scale. The scale's factor structure was further assessed using CFA, and it was verified that the model represented a satisfactory fit. The fit metrics, namely Chi-Square/degree of freedom (3.03), RMSEA (0.054), GFI (0.87), AGFI (0.85), SRMR (0.055), NFI (0.93), NNFI (0.95), and CFI (0.95), provide evidence of the validity and reliability of the model. The Cronbach's Internal Consistency coefficient was re-evaluated in this study and determined to be an.81.

Procedure

Since this research is an experimental study conducted with children under 18, permission was obtained from the university dated 16.02.2024 and numbered 2024/01. It was then performed according to the ethical guidelines outlined in the 1964 Helsinki Declaration and its successor revisions or similar ethical standards. In this context, it was conducted by the ethical standards required for research involving humans according to the 1964 Helsinki Declaration. Informed consent forms were prepared to inform the participants about the purpose of the study, the procedure, and possible risks and benefits.

Data Collection Process and Analysis

The December 2023 issue of TÜBİTAK Science and Children's Magazine was selected in the experimental group. Six topics related to the magazine's 5th-grade first and second units were selected. These topics were turned into video magazines using relevant visuals and programs. Video magazines were prepared using Animaker, Clipchamp, Canva, and Plotagon programs. Audio information in the video magazines was recorded and added by the researchers. After the video magazines were finished, the application was started, and pre-tests were conducted. The six determined topics were explained with video magazines. Following the presentation, a stimulating conversation atmosphere was established by posing questions to the students, and the subjects were further reinforced through digital games. Assessments were conducted after the training. Utilizing learning applications and Wordwall, the researchers developed digital games. Assessive tests were conducted upon completion of the training. Research was conducted on a

sample of 27 students in the experimental group and 27 students in the control group. Before the application, the experimental group was allocated video magazines, while the control group received printed magazines. Both groups were subjected to the Academic Achievement Test and Attitude Scale Towards Digital Technology. The experimental group received 8 hours of comprehensive training using video magazines throughout the two-week implementation phase. In contrast, the control group received the same amount of teaching using printed magazines. After submission, the outcomes were reassessed by administering the Academic Achievement Test and Attitude Scale towards Digital Technology to both cohorts. Initial pretests were administered to the control group. Then, six disciplines were instructed with printed periodicals. Following the lecture, a conversation atmosphere was established by engaging the students in a question-and-answer format, and the implementation of a prearranged taboo game further reinforced the topics. Post-tests were conducted promptly following the completion of the course. A numerical coding technique was used to transmit the raw data collected from the students into the SPSS application. The statistical measures of mean, standard deviation, skewness, kurtosis, Cronbach Alpha, and KR-20 were computed. Statistical analysis revealed that the computed values followed a normal distribution ranging from -2 to +2 (George & Mallery, 2019). Given the assumed normal distribution of the data, the paired t-test was employed to ascertain if there was a significant difference between the pretest and posttest scores of the experimental and control groups. An independent samples t-test was used to assess the statistical significance of the differences between the pretest and post-test scores of the experimental and control groups (Büyüköztürk, 2024). The effect magnitude of the application was determined using Cohen's d test. Cohen's d is a statistical metric that quantifies the magnitude of an impact by dividing the difference in means between two dependent samples by the standard deviation. It is employed to assess the practical importance of the effect. Based on Cohen's (1988) categorized classification, an effect size of 0.2 is small, 0.5 is medium, and 0.8 is high.

FINDINGS

Independent samples t-test was conducted to compare the experimental and control pre-test results of 5th-grade middle school students' attitudes towards digital technology and achievement levels, and the results are presented in Table 2.

Table 2. *Comparison of Pre-Test Unrelated Samples t-test Results for Achievement Test and Attitudes Towards Digital Technology Between Experimental and Control Groups*

Variable	Group	n	M	sd	t	p
Academic Achievement Test	Experimental Group	27	5,48	1,76	1,21	,23
	Control Group	27	6,15	2,25		
Competency	Experimental Group	27	35,67	6,73	,71	,48
	Control Group	27	34,3	7,44		
Social Networks	Experimental Group	27	11,04	4,58	1,27	,21
	Control Group	27	9,63	3,53		
Using Technology in the Classroom	Experimental Group	27	13,89	3,33	,96	,34
	Control Group	27	13,11	2,55		
Interest in Technology	Experimental Group	27	19,37	3,35	,39	,70
	Control Group	27	19,04	2,93		
Technology For Me	Experimental Group	27	14,96	2,62	,77	,44
	Control Group	27	15,48	2,29		
Negative Aspects	Experimental Group	27	17,04	3,75	1,03	,31
	Control Group	27	16,00	3,65		
Entertainment Use	Experimental Group	27	10,52	2,56	1,26	,21
	Control Group	27	9,44	3,61		
Conscious Usage	Experimental Group	27	11,22	2,24	,88	,38
	Control Group	27	11,78	2,39		

According to the information in Table 2, the achievement scores of the experimental and control groups before the application ($t_{(27)}$=1.213, p>.05), competence ($t_{(27)}$=.71, p>.05), social networks ($t_{(27)}$=1.27,

p>.05), use of technology in the classroom ($t_{(27)}$= .96, p>.05), interest in technology ($t_{(27)}$= . 39, p>.05), technology for me ($t_{(27)}$= .77, p>.05), negative aspects ($t_{(27)}$=1.03, p>.05), recreational use ($t_{(27)}$=1.26, p>.05) and conscious use ($t_{(27)}$= .88, p>.05). Samples that are dependent The t-test was employed to assess the statistical significance of the differences between the pretest-posttest scores of the attitudes towards digital technology and achievement scores of the 5th-grade middle school students in the experimental group. The findings are displayed in Table 3.

Table 3. *Results of the Related t-test for The Comparison of The Pre-Test and Post-Test Scores of The Experimental Group's Attitudes Towards Digital Technology and Achievement Test Scores*

Variable	Group	n	*M*	sd	t	p	Cohen d
Academic Achievement	Experimental Group	27	5,48	1,76	14,31	.00*	.88
	Control Group	27	12,37	2,15			
Competency	Experimental Group	27	35,67	6,73	0,79	.44	--
	Control Group	27	37,3	7,72			
Social Networks	Experimental Group	27	11,04	4,58	1,35	.19	--
	Control Group	27	12,63	4,61			
Using Technology in the Classroom	Experimental Group	27	13,89	3,33	1,04	.31	--
	Control Group	27	14,81	3,81			
Interest in Technology	Experimental Group	27	19,37	3,35	1,02	.32	--
	Control Group	27	20,37	3,26			
Technology For Me	Experimental Group	27	14,96	2,62	2,39	.02*	.18
	Control Group	27	16,41	2,29			
Negative Aspects	Experimental Group	27	17,04	3,75	0,18	,86	--
	Control Group	27	16,85	4,13			
Entertainment Use	Experimental Group	27	10,52	2,56	2,69	.01*	.21
	Control Group	27	12,67	4,75			
Conscious Usage	Experimental Group	27	11,22	2,24	1,21	.24	
	Control Group	27	12,04	2,64			

*p<.05

According to the information in Table 3, competence ($t_{(27)}$=0.79, p>.05), social networks ($t_{(27)}$=1.35, p>.05), technology use in the course ($t_{(27)}$=1. 04, p>.05), interest in technology ($t_{(27)}$=1.02, p>.05), negative aspects ($t_{(27)}$=0.18, p>.05), conscious use ($t_{(27)}$=1.21, p>.05) scores did not differ significantly as a result of the application. In addition, it was found that the scores of technology for me ($t_{(27)}$=2.39, p<.05) and recreational use ($t_{(27)}$=2.69, p<.05), which were among the attitudes of the students in the experimental group towards digital technology, differed significantly in favor of the post-test. The Cohen's d effect size of this difference was small. In addition, it was found that the achievement test scores of the students in the experimental group participating in the study increased significantly as a result of the application ($t_{(27)}$= 14.31, p<.05). The Cohen's d effect size of this significant difference was high.

Samples that are dependent The t-test was employed to assess the statistical significance of the differences between the pretest-posttest scores of the attitudes towards digital technology and achievement scores of the 5th-grade middle school children in the control group. The findings are displayed in Table 4.

According to the information in Table 4, the achievement test ($t_{(27)}$ = 1.27, p>.05) and attitudes towards digital technology, competence ($t_{(27)}$ = .00, p>.05), social networks ($t_{(27)}$ = .85, p>.05), technology use in the course ($t_{(27)}$ = .85, p>. 05), interest in technology ($t_{(27)}$ = .28, p>.05), technology for me ($t_{(27)}$ = 1.16, p>.05), negative aspects ($t_{(27)}$ =0.60, p>.05), use for entertainment ($t_{(27)}$ = 1.26, p>.05) and conscious use ($t_{(27)}$ =1.00, p>.05) scores did not differ significantly as a result of the application.

Table 4. *Correlated t-test Results of The Pre-Test and Post-Test Scores of The Control Group's Attitudes Towards Digital Technology and Achievement Scores*

Variable	Group	n	*M*	sd	t	p
Academic Achievement Test	Experimental Group	27	6,15	2,25	,27	,216
	Control Group	27	7,11	3,56		
Competency	Experimental Group	27	34,3	7,44	,00	,00
	Control Group	27	34,3	6,99		
Social Networks	Experimental Group	27	9,63	3,53	,85	,405
	Control Group	27	10,11	3,51		
Using Technology in the Classroom	Experimental Group	27	13,11	2,55	1,20	,241
	Control Group	27	12,37	3,43		
Interest in Technology	Experimental Group	27	19,04	2,93	,28	,781
	Control Group	27	18,89	3,33		
Technology For Me	Experimental Group	27	15,48	2,29	1,16	,256
	Control Group	27	15,04	2,43		
Negative Aspects	Experimental Group	27	16	3,65	0,60	,553
	Control Group	27	15,63	3,73		
Entertainment Use	Experimental Group	27	9,44	3,61	1,26	,219
	Control Group	27	10	3,23		
Conscious Usage	Experimental Group	27	11,78	2,39	1,00	,327
	Control Group	27	11,37	2,59		

Independent samples t-test was conducted to compare the experimental and control pre-test results of 5th-grade middle school students' attitudes towards digital technology and achievement levels, and the results are presented in Table 5.

Table 5. *Findings Regarding The Comparison of The Post-Test Results of Achievement Test and Attitudes Towards Digital Technology According To The Experimental and Control Groups With İndependent Samples t-test*

Variable	Group	n	*M*	sd	t	p	Cohen d
Academic Achievement Test	Experimental Group	27	12,37	2,15	,58	,00	,63
	Control Group	27	7,11	3,56			
Competency	Experimental Group	27	37,30	7,72	,50	,14	
	Control Group	27	34,30	6,99			
Social Networks	Experimental Group	27	12,63	4,61	,26	,03	,17
	Control Group	27	10,11	3,51			
Using Technology in the Classroom	Experimental Group	27	14,81	3,81	,48	,02	,19
	Control Group	27	12,37	3,43			
Interest in Technology	Experimental Group	27	20,37	3,26	,65	,11	
	Control Group	27	18,89	3,33			
Technology For Me	Experimental Group	27	16,41	2,29	,13	,04	,15
	Control Group	27	15,04	2,43			
Negative Aspects	Experimental Group	27	16,85	4,13	,14	,26	
	Control Group	27	15,63	3,73			
Entertainment Use	Experimental Group	27	12,67	4,75	,41	,02	,18
	Control Group	27	10,00	3,23			
Conscious Usage	Experimental Group	27	12,04	2,64	,94	,35	
	Control Group	27	11,37	2,59			

According to the information in Table 5, it was determined that the achievement test scores of the experimental and control groups differed significantly ($t_{(27)}$=6.58, p<.05) after the application, and the Cohen's d effect size of this difference was medium. It was also found that the scores of the experimental and control groups differed significantly after the application in the sub-dimensions of attitudes towards digital technology, social networks ($t_{(27)}$=2.26, p<.05), use of technology in the lesson ($t_{(27)}$=2.48, p<.05),

technology for me ($t_{(27)}$=2.13, p<.05), use for entertainment purposes ($t_{(27)}$=2.41, p<.05) and the Cohen's d effect size of this difference was low. In addition, it was found that the experimental and control groups did not differ significantly according to competence ($t_{(27)}$= .50, p>.05), interest in technology ($t_{(27)}$= 1.65, p>.05), negative aspects ($t_{(27)}$= 1.14, p>.05) and conscious use ($t_{(27)}$= .94, p>.05) after the application.

DISCUSSION AND CONCLUSION

The present study sought to investigate the impact of video magazines on students' academic performance and attitudes towards digital technology. The research utilized TUBITAK Bilim Çocuk Magazine and other video magazines. Quantitative instruments were administered to both groups before and following the experiment, and their impacts were examined. The constructed video magazines were implemented biweekly, and the outcomes were analyzed. Analysis of the 20-question accomplishment test devised by the researchers revealed no significant difference in the pre-test scores between the experimental and control groups. Following the implementation of the experimental approach, it was seen that the accomplishment test scores of the experimental group exhibited a substantial increase. Furthermore, it was noted that the outcome test scores of the control group showed no statistically significant difference. Upon evaluation of the literature, it is evident that video journals have a substantial impact on academic performance (Almumen, 2023; Frazier & Eick, 2015; George & Mallery, 2019; Limueco & Prudente, 2020; Lo, Lee, & Tien 2020; Nasim, Siddiqi, & Shamshir, 2021). It can be said that video journals increase student interest and motivation and provide more in-depth engagement with learning materials (Hakkarainen et al., 2017). Such digital content can facilitate learning by concretizing abstract concepts, which can be said to increase the academic achievement of the experimental group (Mayer, 2009). In addition, multimedia tools such as video journals can appeal to different learning styles of students, which can increase achievement by providing diversity in the learning process (Gupta & Fisher, 2018). In addition, the lack of a significant difference in the control group's scores indicates that traditional methods may be insufficient to attract students' interest or reinforce knowledge effectively (Clark, 1994). According to Kirschner and Karpinski (2010), it is suggested that students exposed to digital content develop more positive attitudes towards digital technologies and may contribute positively to academic achievement. This information in the literature supports the idea that using digital technologies as pedagogical tools has a significant impact on increasing student achievement. In addition, it can be said that digital learning materials provide advantages in attracting students' attention and making the learning process more effective than traditional methods.

It was determined that the competence, social networks, use of technology in the course, interest in technology, negative aspects, and conscious use scores of the students in the experimental group did not differ significantly as a result of the application. In addition, it was determined that the scores of the students in the experimental group who participated in the study, from the attitudes towards digital technology, technology for me, and recreational use scores, differed significantly in favor of the post-test. The Cohen's d effect size of this difference was small. In addition, it was found that the achievement test scores of the students in the experimental group participating in the study increased significantly due to the application. The Cohen's d effect size of this significant difference was high. The total scores of the control group before and after the experiment did not differ significantly in any sub-dimension. In line with these findings, it can be said that the program created significant changes in students' attitudes towards technology and achievement test scores and was especially effective in recreational technology use and achievement. Spicer (2014) found a relationship between journals prepared with video summaries created from scientific studies and technological attitudes, which supports the study's findings. In a study investigating video games and new media use in medical education, 98% of medical students emphasized that video games and new media should be used in education (Kron et al., 2010). It can be said that this finding indirectly supports the results of the study. Again, in his study, Kay (2012b) taught technological skills to pre-service teachers using video

podcasts. According to the results of this study, although generally positive attitudes developed, some teachers concluded that video podcasts should be elaborated and used as a complementary teaching tool. What needs to be considered here is that the content of the videos should be designed and used in the lessons to increase the quality, interactivity, and high-level cognitive skills in terms of teaching, rather than opening a standard video and having students watch it. In this case, it can be said that the results of this study partially support the research findings. In addition, in other studies in the literature, studies in which Web 2.0 tools' attitudes towards digital technology were measured were found. In these studies, the fact that the attitude scale showed significant differences in favor of the experimental group (Köse, Bayram & Benzer 202; Perçin 2019; Taşlıçay Arslan 2019) supports the research findings. The finding of differentiation in the technology for me sub-dimension can be said to be due to the fact that the intensive use of digital technologies for individual and educational purposes positively affects students' attitudes toward these technologies. In particular, students' self-efficacy perceptions and frequency of use of technology enable them to adopt technology and develop positive attitudes (Hsu & Wu, 2019; Scherer et al., 2019). This situation and the fact that technology is seen as an effective tool for achieving individual goals increases the intention to use it and causes students to view technology more positively (Lai, 2011; Teo, 2008; Venkatesh et al., 2003). Considering the predisposition and interest of today's children in digital technology, it is possible to say that the increase in this sub-dimension is preferred by students who love innovations. The main reason for the significant difference in the sub-dimension of recreational use is that digital technologies are widely used in entertainment and leisure activities, especially among young individuals (Lai et al., 2013). Recreational use of technology leads individuals to develop more positive attitudes toward technology by increasing their digital skills (Hargittai & Hinnant, 2008). Young people's proximity to technology and their intensity in recreational use support this attitude differentiation (Jones & Shao, 2011). At the same time, the use of media and digital technologies for daily entertainment contributes to reinforcing attitudes toward technology (Rideout et al., 2010; Livingstone, 2008). As a result, recreational use of digital technology increases individuals' digital skills and positive attitudes towards technology, supporting young people's affinity for technology and attitude differentiation.

This study examined the impact of video journals on students' academic achievement and attitudes towards digital technology. The results showed that video magazines significantly increased students' academic performance, and there was a positive differentiation, especially in the use of technology for entertainment purposes and the technology for me sub-dimension. Using digital technologies for personal and educational purposes positively affected students' attitudes toward technology and effectively increased their achievement. Using digital technology for recreational purposes improved students' digital skills and led them to adopt technology more positively. While traditional methods were insufficient to achieve these effects, video magazines were more effective in attracting students' attention and facilitating learning. These findings suggest that digital content should be widely used in education and can contribute more to students' learning processes.

Suggestions

Based on the findings of this study, video journals can be used in various fields of education. First, creating video journal libraries can convey scientific information and current developments to large masses. In this way, the scientific awareness of the society can be increased. In addition, digital scientific platforms can be created to disseminate teacher training and cultural environments; this will contribute to making educational research more effective and accessible. Using the panoramic video technique, all interactions in the classroom environment can be recorded and used for comprehensive analysis in teacher training. Thus, classroom management and teaching processes can be examined more deeply, and areas for improvement can be identified. For teachers, the quality of the teaching process can be improved by preparing video

journals that will provide interactive and in-depth learning related to the topics in the units. In addition, video journals can be prepared on intriguing and exciting scientific issues to ensure students' active participation in learning. This will provide students with the skills of researching, accessing suitable sources, and learning. Finally, the effect of educational environments created with interactive video journals focused on developing higher-order cognitive thinking skills and reducing misconceptions can be examined.

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