

## The Effectiveness of TPACK-Oriented Interactive Learning Media on Fourth Grade Learning Outcomes at UPT Sd Negeri 183 Gresik

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**Abstract:** The purpose of this study was to determine the effectiveness of TPACK-oriented interactive learning media on the learning outcomes of fourth-grade students of UPT SD Negeri 183 Gresik. This research is experimental research with a quantitative approach. The research design used is one group pretest-posttest. Data analysis in this study is a paired sample T-test parametric analysis. The subjects of this study were 32 graders of UPT SD Negeri 183 Gresik. The results showed that there were differences between student learning outcomes before and after using TPACK-oriented interactive learning media. Student learning outcomes obtained at the time of the pretest still did not meet the KKM value set by the school. The average student pretest learning outcomes are 33.75. Student learning outcomes at the posttest showed an average increase to 85.63. Based on the results of the statistical output of the paired T-test, it shows sig(2 tailed)  $0.000 < 0.05$ . In this case, it can be concluded that  $H_a$  is accepted, meaning that TPACK-oriented interactive learning media is effective in the learning outcomes of fourth-grade students of UPT SD Negeri 183 Gresik.

**Keywords:** Learning Outcomes, Learning Media, TPACK

**Abstrak:** Penelitian ini bertujuan untuk mengetahui efektivitas media pembelajaran interaktif berorientasi TPACK terhadap hasil belajar siswa kelas IV UPT SD Negeri 183 Gresik. Penelitian ini merupakan penelitian eksperimen dengan pendekatan kuantitatif. Desain penelitian yang digunakan yaitu one group pretest-posttest. Analisis data dalam penelitian ini yaitu uji analisis parametrik paired sample T-test. Subjek penelitian ini yaitu siswa kelas IV UPT SD Negeri 183 Gresik yang berjumlah 32. Hasil penelitian menunjukkan bahwa terdapat perbedaan antara hasil belajar siswa sebelum dan sesudah menggunakan media pembelajaran interaktif berorientasi TPACK. Hasil belajar siswa yang diperoleh pada saat pretest masih belum memenuhi nilai KKM yang ditetapkan oleh sekolah. Rata-rata hasil belajar pretest siswa yaitu 33,75. Hasil belajar siswa pada saat posttest menunjukkan peningkatan rata-rata menjadi 85,63. Berdasarkan hasil output statistik uji paired T-test menunjukkan sig(2 tailed)  $0.000 < 0.05$ . Dalam hal ini dapat disimpulkan bahwa  $H_a$  diterima, artinya media pembelajaran interaktif berorientasi TPACK efektif terhadap hasil belajar siswa kelas IV UPT SD Negeri 183 Gresik.

**Kata kunci:** Hasil Belajar, Media Pembelajaran, TPACK

### INTRODUCTION

The development of technology in the 21st century is happening so fast and has a great influence on every aspect of life, including education. Even today's technology is becoming increasingly needed in the world of education (Nasar & Daud, 2020). The use of technology in education is very helpful in the education management process, one of which is the learning process in schools. In the survival of society, education is one of the most important elements because it can form a society with good character and behavior (Dhawati & Hariyatmi, 2017). One of the keys to the success of education in schools lies in a teacher, namely as a professional as well as a learning agent (Fitriyana et al., 2021).

Teachers have roles as facilitators and mediators at the elementary school level (Akhwani & Rahayu, 2021). In the learning process in the classroom, teachers in 21st-century learning are not

enough just to master pedagogical abilities, but also have to master the content of the material being taught and the use of technology to support the teaching and learning process. These three components are integrated into one unit known as Technological, Pedagogical, and Content Knowledge (TPACK) (Koehler & Mishra, 2008). Technological knowledge (TK) is knowledge about software and hardware or everything related to technology, information, and communication (ICT). Pedagogical knowledge (PK) is knowledge about how to manage classroom conditions, how to deliver learning materials, and how to guide students. Content knowledge (CK) is knowledge about the subject matter. These three pieces of knowledge are an integrated whole and must be mastered by 21st-century teachers.

21st-century education requires teachers who can master and collaborate on pedagogical, content, and technological competencies (Turmuzi & Kurniawan, 2021). The implementation in the field turns out that elementary school teachers are still having difficulties in implementing learning based on the TPACK framework. Therefore, in this study, the use of TPACK-oriented interactive learning media was tested which is expected to stimulate students in improving their learning outcomes. In this case, the researcher conducted a research entitled Effectiveness of TPACK-Oriented Interactive Learning Media on the Learning Outcomes of Fourth Grade Students of UPT SD Negeri 183 Gresik. Based on the explanation above, in general, this article aims to determine the effectiveness of interactive learning media used with TPACK orientation.

## METHODS

This study uses an experimental research type with a quantitative approach. The design of this research is one group pretest-posttest. The place and subject of the research consisted of 32 fourth-grade students who were held at UPT SD Negeri 183 Gresik. Data collection techniques in the form of a written test given to students. Pretest sheets were given to students before treatment, while posttest sheets were given to students after treatment. In this case, the treatment is in the form of using interactive learning media oriented to TPACK on the material of multiples and number factors. The test instrument consists of 5 description questions. The questions on the pretest-posttest sheets are made differently with the same question grid. Test the validity and reliability of this study using the validity of experts and analysis of the calculation of the level of difficulty of each item. The data that has been obtained is then analyzed by using the statistical paired sample T-test using the SPSS version 26 application.

## RESULT AND DISCUSSION

The results of this study were made based on data obtained from the activities of the study. The following are the results of this study:

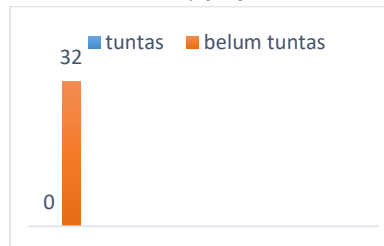
### **1. Fourth-grade students' learning outcomes before using TPACK-oriented interactive learning media.**

Knowing the learning outcomes of fourth-grade students before the intervention, it was obtained through a pretest. The results of the pretest were then analyzed through descriptive statistics using SPSS version 26. The following are the learning outcomes of fourth-grade students of UPT SDN 183 Gresik before using TPACK-oriented interactive learning media:

**Table 1. The results of the descriptive statistical analysis**

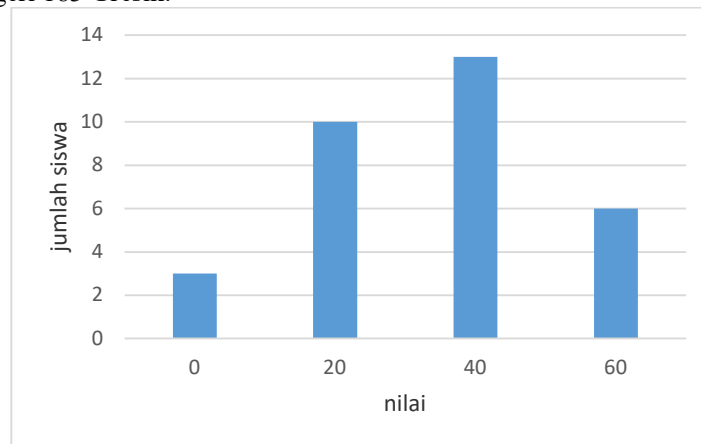
Descriptive Statistics						
	N	Minimum	Maximum	Sum	Mean	Std. Deviation
pretest	32	0	60	1080	33.75	17.916
posttest	32	40	100	2740	85.63	17.027
Valid N (listwise)	32					

Based on these results, it can be seen that the results of the pretest descriptive analysis consisting of 5 description questions were filled out by 32 respondents (students). The highest value (maximum) is 60 and the lowest value (minimum) is 0. Meanwhile, the average value (mean) is 33.75 and the standard deviation is 17.916.



**Figure 1. Completeness Bar Diagram of Pretest Results**

Before the application of learning media, student learning outcomes in mathematics have not yet reached the KKM. The highest score that can be achieved by students is 60 and the lowest score is 0. The results of the pretest show that of the 32 students. There are still no student pretest results who can reach the minimum completeness criteria (KKM) determined by the school, which is 75. The following is a picture of the pretest scores obtained by the fourth-grade students of UPT SD Negeri 183 Gresik:



**Figure 2. Diagram of the acquisition of pretest scores**

Based on the diagram above, it is known that as many as 13 students get a value of 40, as many as 10 students get a value of 20, as many as 6 students get a value of 60, and as many as 3 students get a value of 0. Most students are only able to get a value of 40, so it can be said that student learning outcomes before using this learning media are still low.

The low student learning outcomes in mathematics are certainly caused by one thing. 2 factors can cause low learning outcomes, namely internal factors, and external factors. Internal factors include the low learning motivation of students. External factors can be in the form of less attractive learning methods. This is in line with the research results of Atiaturrahmaniah et al,

(2021) which state that the factors that cause student learning difficulties are internal factors including student attitudes towards mathematics lessons that affect the learning process, low learning motivation, and body health. While external factors include the family environment, the use of less varied learning methods, the use of learning media that has not been maximized, as well as facilities and infrastructure in schools.

Efforts made by researchers to increase student motivation are using the help of learning media. Febrita & Ulfah, (2019) stated that one of the efforts to increase interest and motivation in learning is through the use of good and correct, and interesting learning media. When students have an interest in something new in learning, it can stimulate their curiosity and can help equalize perceptions of the material presented by the teacher.

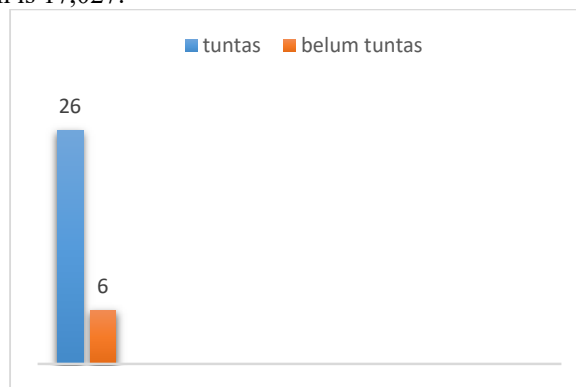
## 2. Fourth-grade students' learning outcomes after using TPACK-oriented interactive learning media.

Fourth-grade students' learning outcomes after treatment were obtained through posttest results. The posttest results were then analyzed through descriptive statistics using SPSS version 26. The following are the results of the post-test descriptive statistical analysis for fourth-grade students of UPT SDN 183 Gresik after using TPACK-oriented interactive learning media:

**Table 2. The results of the descriptive statistical analysis**

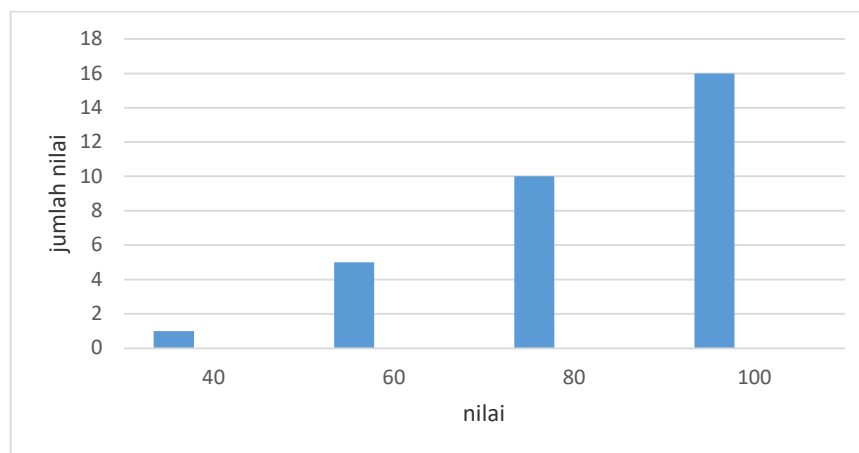
Descriptive Statistics						
	N	Minimum	Maximum	Sum	Mean	Std. Deviation
pretest	32	0	60	1080	33.75	17.916
posttest	32	40	100	2740	85.63	17.027
Valid N (listwise)	32					

Based on these results, it can be seen that the results of the post-test descriptive analysis consisting of 5 description questions were filled out by 32 students. The highest value (maximum) is 100 and the lowest value (minimum) is 40. Meanwhile, the average value (mean) is 85.63 and the standard deviation is 17,027.



**Figure 3. Completeness Bar Diagram of Posttest Results**

From the results of the diagram above, it can be seen that as many as 26 students were declared complete because they scored >75 and 6 students had not completed because the score was <75. In this case, the number of students whose posttest results meet the KKM increased compared to before using interactive learning media with TPACK orientation. The following is a picture of the post-test scores of fourth-grade students of UPT SD Negeri 183 Gresik:



**Figure 4. Diagram of the acquisition of posttest scores**

Based on the diagram above, it is known that as many as 16 students got a score of 100, as many as 10 students got a score of 80, as many as 5 students got a value of 60, and as many as 1 students got a value of 40. Most of the students had obtained a value of 100, so it can be said that student learning outcomes after using this learning media that is in the high category.

The use of TPACK-oriented interactive learning media in mathematics can increase students' enthusiasm for accepting the material presented by the presenters during the teaching and learning process. Learning in the classroom becomes active and reciprocity occurs between the speaker and the students. This is in line with the opinion of Sumiharsono & Hasanah (2017) that teaching aids can help increase student interest in learning and facilitate the delivery of learning materials by teachers. The use of TPACK-oriented interactive learning media is expected to provide solutions and assist teachers in delivering material on mathematics subjects to improve learning outcomes for grade IV UPT SD Negeri 183 Gresik.

### 3. The effectiveness of TPACK-oriented interactive learning media on fourth-grade students' learning outcomes on multiples number factors

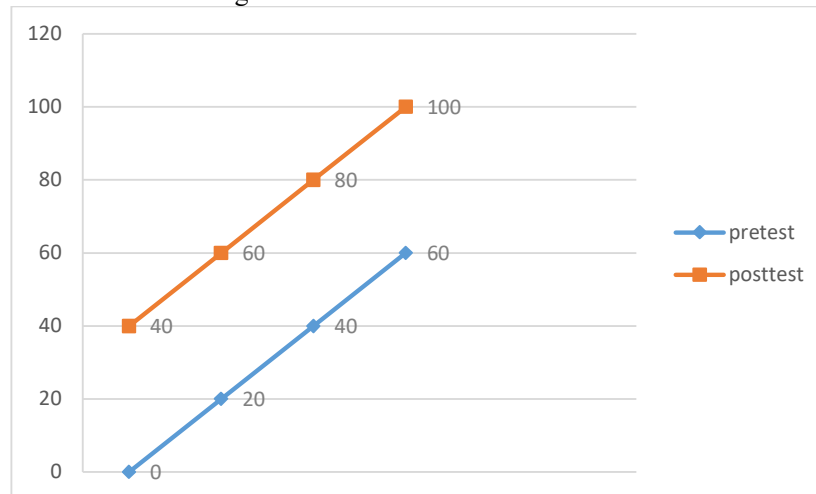
Based on the results of research in the field that has obtained data on student learning outcomes before and after using TPACK-oriented interactive learning media in mathematics learning material factors and multiples of numbers, it can be seen that student learning outcomes have increased. After the data is declared to meet the assumption test and the data is normally distributed, then the hypothesis test is carried out using a comparative test, namely the paired sample t-test. The results of hypothesis testing in this study are using SPSS version 26 calculations with the following results:

**Table 3. Paired Samples Test Result**

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	pretest posttest	-51.875	20.859	3.687	-59.395	-44.355	-14.069	31	.000

Based on the results of the SPSS calculation above, it can be seen that the value of sig. (2-tailed) is 0.000. this means  $0.000 < 0.05$ , it can be concluded that  $H_0$  is rejected and  $H_a$  is accepted. This means that TPACK-oriented interactive learning media is effective on students' cognitive learning outcomes.

From these results, it can be seen that there is an increase in learning outcomes before and after giving treatment, therefore it can be concluded that TPACK-oriented interactive learning media is effective on mathematics learning outcomes for fourth-grade students of UPT ADN 183 Gresik on factor and number multiples material. The following is a diagram showing the improvement of student learning outcomes:



**Figure 5. Pretest-posttest improvement diagram**

From the diagram above, it can be seen that there is an increase in learning outcomes before and after giving treatment, therefore it can be concluded that TPACK-oriented interactive learning media is effective on mathematics learning outcomes for fourth-grade students of UPT SDN 183 Gresik on the material of factors and multiples of numbers. Dewi & Budiana (2018) Stated that learning is said to be effective if there are changes in students' cognitive, affective, and psychomotor aspects. Changes in cognitive aspects, for example, there is a change in the achievement of students' knowledge values so that they meet the minimum competency limits that have been formulated.

## CONCLUSION AND SUGGESTIONS

Based on the results of the study, it can be concluded that this study shows that the TPACK-oriented interactive learning media is effective in the learning outcomes of fourth-grade students. The results of the statistical test output of the paired T-test showed sig(2 tailed)  $0.000 < 0.05$ . Student learning outcomes before treatment had not yet reached the KKM. The average pretest score of students is 33.75. While in the post-test, the average student learning outcomes increased to 85.63.

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