

The Effectiveness of PowToon Audiovisual Media on Mathematics Learning Three-Dimensional Geometry Object Elementary School

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ARTICLE INFO	ABSTRACT
<p><u>Article History</u></p> <p>Received : 21 Nov 2022</p> <p>Revised : 23 Dec 2022</p> <p>Accepted : 11 Feb 2023</p> <p>Available Online : 15 Feb 2023</p> <hr/> <p>Keywords:</p> <p>Effectiveness</p> <p>PowToon</p> <p>Interactive Learning Media</p> <p>Concept Understanding</p> <p>Geometry</p> <hr/> <p>Please cite this article APA style as:</p> <p>Anjarsari, E., Juniati, D., & Khabibah, S. (2023). The Effectiveness of PowToon Audiovisual Media on Mathematics Learning Three-Dimensional Geometry Object Elementary School. <i>Vygotsky: Jurnal Pendidikan Matematika dan Matematika</i>, 5(1), pp. 45-54.</p>	<p>This research is a descriptive study with the aim of knowing the effectiveness of the PowToon audiovisual media in mathematics learning for elementary school students, with is viewed from three indicators, namely (1) the activity of students during PowToon audiovisual media, (2) student learning outcomes, and (3) students positive responses after participating in learning using PowToon audiovisual media. The results showed that mathematics learning using PowToon audiovisual media was effective. The learning outcomes of students after participating in learning using the PowToon audiovisual media were complete, with a classical percentage of 85,19%. Students positive responses to mathematics learning using PowToon audiovisual media meet the effectiveness criteria with 88,5% of student responses reaching the positive category.</p>

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1. Introduction

The rapid development of technology today has a major influence in the field of communication and in other fields. Especially in the field of education, current learning activities use technology to help teachers and students in learning activities. One of the goals of education in Indonesia is to develop students' abilities to become more creative human beings. Thus, it is necessary to change the national curriculum from KTSP to 2013 Curriculum, where in 21st century education creativity is needed and one of the important parts (Mann, 2009).

Therefore, teachers and prospective elementary school teachers are required to get used to thinking creatively, not only having cognitive abilities that are

prepared in designing teaching and learning activities. One way to increase students' interest in mathematics is to design interesting learning (Widiana & Jampel, 2016). The demand to use various learning media and more sophisticated equipment is a real demand that is in accordance with the advancement of Educational Technology and Learning Technology.

As time goes by, in the world of education which is starting to enter the era of the media world, teaching and learning activities are required to reduce learning in using the lecture method so that it is replaced by using various kinds of learning media. The selection of learning models should place more emphasis on student activity and process skills, thus making the role of learning media very important.

There is a link between education and learning media, without the right learning media, the process of learning activities will not run smoothly. Learning media in schools must contain elements that are interesting and funny so that in learning activities students can play while learning (Anjarsari, 2019). Interactive multimedia-based learning media is a learning medium whose application of learning is student-centred by using attractive animation software. By utilizing multimedia as a learning medium, the teacher will no longer be the only source of students in learning and students are expected to be more active when participating in learning.

During teaching and learning activities there are still some active teachers in explaining the material while students are only required to listen, then record the teacher's explanations and complete the exercises contained in the book, this makes students bored because the learning model is only (teacher centered).

The results of field observations that have been carried out at SDN Mantup 1 Lamongan show that the media usually used by teachers at the school are still using traditional media. There are also teachers who have used PowerPoint as a media. In this day and age, it is very sophisticated, even presentation media have been found in addition to PowerPoint, including online presentation media that without having to buy software first, many are found such as Slide Share, Prezi, Slidedog, PowToon, and many others (Anjarsari et al., 2020).

The purpose of this study was to determine the level of effectiveness and practicality of PowToon-based audiovisual learning media. The effectiveness and practicality of learning media is carried out on flat-shaped material so that later it can be conveyed to students by using interesting animations, so that students are expected to be more enthusiastic and not bored in participating in learning.

Based on the presentation that has been presented, PowToon audiovisual media is very useful for elementary school students. The media needs to be developed, because the media previously used are still ancient and traditional. What distinguishes the powtoon media that researchers have developed from other powtoon media is the material that will be compiled. The material is more focused on elementary students because it is to attract interest in learning so that it is hoped that it can help students improve learning outcomes.

Therefore, the problem raised in this study is how the level of effectiveness and practicality of PowToon audiovisual media in learning mathematics has been developed.

2. Method

The research was conducted at SDN Mantup 1. This research was a quantitative study using the Experimental Quasi Design method (pseudo-experimental design)

with a non-equivalent control group model. In this model the sample uses one class, namely the experimental class. The population in this study was SDN Mantup 1, namely students in class 4A, totaling 27 people, where the selection of the research sample was carried out using a purposive sampling technique. Purposive sampling or a technique that has a purpose is a sampling technique that does not select samples randomly and does not determine samples from classes or strata but is selected based on a consideration (Maharani & Bernard, 2018). This research was conducted in August-September 2020, namely in the odd semester of the 2020/2021 academic year. This research was conducted door to door because it must still refer to health protocols during the Covid-19 pandemic.

The test subjects in this study were students of SDN Mantup 1 Lamongan. The trial to measure the feasibility of the learning outcomes test instrument (THB) used fourth grade students. The small group trial consisted of 3 students, and the large group trial consisted of 27 students. The independent variable in this research is the powtoon audiovisual learning media and the learning outcomes of class 4A students at SDN Mantup 1 are the dependent variable. The data collection technique used in this collection is by distributing tests and teacher observation sheets. For the teacher's observation sheet, it was given to the class 4A teacher (experimental) to fill in when the treatment was given.

Test and non-test techniques are used at the data collection stage. The resulting data is qualitative and quantitative. Quantitative data were obtained from student response questionnaires and the percentage of filling in the implementation observation sheet in seeing the practicality of the media being developed. Researchers make observations to present a real picture events, to be able to answer questions, help identify or understand human behavior, and evaluate certain aspects and provide feedback on those measurements (Anjarsari, 2019). Quantitative data was also obtained from student learning outcomes tests. while the qualitative data was obtained from the results of expert assessments regarding product and instrument feasibility, product validity data, and teacher and student observation assessment data on the practicality and effectiveness of the product. There are three quality criteria for product development according to (van den Akker, 1999):

Table 1. Research Instruments Based on the Measured Product Quality Criteria

Instrument	Quality Criteria
Media Validation Sheet	Validity
Material Validation Sheet	
Study Results Test Sheet	Practicality
Student Activity Observation Sheet	
Student Response Sheet	Effectiveness
Teacher's Observation Sheet	

The data obtained in this development research will be analyzed as follows:

2.1. Device Validity Data Analysis

What is meant by validity in a development research is to include content validity and construct validity. It is said that the product is valid if it meets the theory and there is a consistent relationship between all components of the product. The results of the validity of this study have been presented in a journal entitled

Development of PowToon Audiovisual Media in Mathematics Learning for Elementary School Students, with a validity score by material experts is 3.53 and in the media aspect a score of 3.28 with a valid category. Based on these results, this audiovisual learning media is feasible and can be used (Anjarsari et al., 2020).

2.2. Device Practicality Data Analysis

Learning tools are said to be practical if from the results of observations of the implementation of the test good conclusions are obtained and based on the results of interviews with practitioners do not change the device as a whole. This practicality data is obtained from the teacher activity data which is observed through the observation sheet.

2.3. Device Effectiveness Data Analysis

The effectiveness of the device is measured by three indicators, namely in terms of Cognitive, Psychomotor and Affective. The cognitive aspect is based on the results of the Learning Outcome Test (THB), the psychomotor aspect is based on the results of the average student activity and the affective aspect is based on the results of the student's response.

2.3.1 Analysis of Learning Outcome Test Data

This test is analyzed using the following steps:

1. Calculating the student's THB score.
2. Estimating the number of students' THB results with a minimum score of 70.
3. Determine the student learning outcomes test based on the KKM that the school has set, which is 75, so it is categorized as successful in terms of cognitive.

2.3.2 Data Analysis of Student Activity Observation Results

Observation data using the following steps:

1. Counting the number of values from all meetings.
2. Estimating the average score percentage using the formula:

$$SR = \frac{ST}{SM} \times 100\%$$

Description:

SR = the average score of the observations (in percent)

ST = the total score of the observations

SM = the maximum score obtained from the results of observations

3. Categorizing the percentage of student completeness based on observations of student activity

Table 2. Criteria for Observing Student Activity

Skor	Criteria
$3,5 \leq S_{\gamma} < 4$	Very Active
$2,5 \leq S_{\gamma} < 3,5$	Active
$1,5 \leq S_{\gamma} < 2,5$	Less Active
$1 \leq S_{\gamma} < 1,5$	Not Active

3. Results and Discussion

3.1. Small Group Trial Results

In small group trials it is intended to identify problems when the media is used

before it is used. In the implementation of trials that are prepared in a coherent manner, there are several instruments needed during development and testing trials, including instrument observation and results calculation (Syaodih, 2014). The implementation was tested on three grade IV students. Selection based on the criteria of each category of high ability, medium ability, and low ability category. The data was obtained based on the results of interviews with mathematics teachers. Students who were selected in the small group trial were asked to provide comments about the media developed by filling out the questionnaire that had been distributed. Comments and input from this small group trial will be used as material to revise the product. Based on the test, only one of the three students asked how to fill in the instrument, this indicated that there was no need for revisions to the media being developed.

3.2. Large Group Trial Results

3.2.1. Test Results

The media that has been revised and prepared based on the small group trial is continued to enter the large group trial stage. The sample used in this trial is larger and wider. The following are the results of the data obtained:

Table 3. Student Learning Outcomes Test Table

No	Name	Raport Value	Skor THB	Criteria
1	ASP	65	78	Complete
2	APP	77	82	Complete
3	ALS	7	82	Complete
4	AS	69	80	Complete
5	AWA	67	77	Complete
6	DS	77	82	Complete
7	DYH	47	58	Incomplete
8	EAP	68	50	Incomplete
9	FDAN	64	74	Complete
10	FLS	53	77	Complete
11	FA	60	72	Complete
12	GZA	68	73	Complete
13	HEPA	56	52	Incomplete
14	IN	59	80	Complete
15	KRY	57	80	Complete
16	KPA	69	74	Complete
17	LMP	72	88	Complete
18	MAA	62	84	Complete
19	MR	61	86	Complete
20	MFARF	80	46	Incomplete
21	MHA	82	84	Complete
22	MIA	49	70	Complete
23	PD	79	70	Complete
24	PS	54	86	Complete

No	Name	Raport Value	Skor THB	Criteria
25	RA	54	88	Complete
26	RYP	82	82	Complete
27	SNQA	85	60	Incomplete

From the test scores used to determine students' cognitive abilities after participating in learning using audiovisual media developed by researchers. Of the 27 students who took the test, it was found that 23 students scored above the predetermined standard (score 70 out of a maximum score of 100) and the rest did not meet. So that the percentage of completeness of cognitive abilities in a classical manner is 85.19%.

3.2.2. Observation Results of Student Activities

Observations were made by researchers and teachers at 1 meeting after the learning test was carried out. The scores from the observations were then recapitulated and analyzed. Score recapitulation is shown in the table below:

Table 4. Recap of Student Observation Results

Step	Indicator	Meeting Score		Mean
		Observer 1	Observer 2	
Opening	Observing learning objectives	4	3	3,5
	Agree on a definition of matter	3	3	3,0
Core	Gather information and problems	4	4	4,0
	Discuss problem solving	4	4	4,0
	Discuss problems with the teacher	3	3	3,0
Conclusion	Report and draw conclusions	3	4	3,5
	<i>Mean</i>			3,5
	<i>Percentage (%)</i>			87,5%

The results of student observations were carried out by 2 observers for 1 meeting. The observation results are one of the supporting data for effectiveness in terms of students' psychomotor aspects. Overall, an average score of 3.5 is obtained. Thus, the criteria for student activity, achieve very active criteria.

3.2.3. Student Response Questionnaire Results

The sheets were filled in by 27 students, then recapitulated and analyzed. The recapitulation of student response scores is shown in the table below:

Table 5. Recap of Student Response Results

No	Questionnaire Questions	Answer		Percentage	
		Yes	No	Yes	No
1	Do you enjoy learning?	25	2	92,6	7,41
2	Do you like the way the teacher explains?	20	7	74,1	25,9

No	Questionnaire Questions	Answer		Percentage	
		Yes	No	Yes	No
3	Does the program look attractive?	24	3	88,9	11,1
4	Is the presentation of the animation attractive and easy to understand?	25	2	92,6	7,41
5	Is the language in the media clear and easy to understand?	22	5	81,5	18,5
6	Can video media be used repeatedly?	26	1	96,3	3,70
7	Can learning animation video media add interest in learning?	24	3	88,9	11,1
8	Can learning animation video media enable me to study independently?	24	3	88,9	11,1
9	Does learning animation video media make it easier to understand the material?	22	5	81,5	18,5
10	Do you agree if this lesson is taught for other materials?	27	0	100	0
<i>Mean</i>		23,9	3,1		
<i>Percentage (%)</i>		88,5%	11,5%		

The student response questionnaire in Table 6 above can be seen in question 2 obtaining the lowest positive answer, namely about students feeling happy or not with the way the teacher explained, then in question 10 obtaining the highest positive answer, namely about approval if this lesson is taught for material that other. The effectiveness of learning in terms of affective obtained from the results of the student response questionnaire. Student response questionnaire sheets were filled in by 27 students. Overall results, the percentage on each question obtained 88.5% with the answer "yes" and 11.5% with the answer "no". It can be concluded that all students liked the media that was developed and gave a positive attitude to PowToon audiovisual media-based learning.

3.2.4. Results of Device Practicality Data Analysis

The practicality of the device data was taken based on the observer's assessment, namely the parents of students in assessing the practicality of the learning media given. Then the following data is obtained:

Table 6. Recap of Student Practicality Questionnaire Data

No	Aspect	Sub Aspect	Mean	%
1	Aspects of program results	a. Clarity and accuracy of content	3,74	93,51%
		b. Clarity and accuracy of learning animation video media products	3,67	91,67%
		c. language accuracy	3,63	90,74%
2	Effectiveness for students	a. practicality in the user	3,74	93,52%
		b. media products can be used repeatedly	4	100%
		c. accuracy in using language	3,07	76,85%
		d. the ability of media products to generate interest in learning mathematics	3,89	97,22%
		e. product ability to clarify and facilitate students in learning	36,0	89,81%
		f. the use of products allows students	3,85	96,30%

No	Aspect	Sub Aspect	Mean	%
		to learn independently according to the abilities and interests of students		
		g. the use of media products allows students to overcome learning difficulties	3,63	90,74%
		<i>Mean</i>	3,68	
		<i>Percentage (%)</i>		92,03%

From the results of the practicality observation data recapitulation, a score of 3.68 was obtained with a percentage of the observation score of 92.03%, then based on the criteria for the percentage of the average score the practicality data fulfilled the practical criteria, which was very good.

3.2.5. Overall Data Analysis

After all development activities have been completed, the data obtained is then calculated and then analyzed according to the criteria that have been formulated. Overall, the assessment results and criteria are detailed as follows:

Table 7. Overall Analysis Results

No	Data	Score	Criteria
1	Learning Outcomes Test Scores	85,19 %	Effective
	Student Activity Observation Value	87,5%	
	Student Response Score	88,5%	
2	Value of Practical Observation	92,03 %	Practical

Based on the table data above, it was found that the developed PowToon audiovisual learning media showed that the product met the criteria that had been formulated. This is supported by the results of research and the presentation of Syahril, et al that Powtoon media has a better ability to improve students' cognitive learning outcomes in Integrated Social Studies subjects in Junior High Schools. This can be seen from the increase in student learning outcomes after being treated using Powtoon media (Studi et al., 2022).

4. Conclusions

Based on the results of research on the effectiveness of the development of PowToon audiovisual media for mathematics learning at SDN Mantup 1 which had been developed by researchers, it was declared effective and practical. In each aspect of the student's ability to manage learning by using the PowToon audiovisual media it was observed that it met the effective criteria with a fairly good minimum grade category. After participating in learning using the PowToon audiovisual media, the students' learning outcomes were complete, with a classical percentage of 85.19%. Positive student responses to learning mathematics using PowToon audiovisual media met the effectiveness criteria with 88.5% of student responses reaching the positive category.

The researcher hopes that further research will be carried out on the use of PowToon audiovisual media so that it can be used in other subjects or at other higher levels of education. It is hoped that educators will study hard again and want to try to take advantage of their abilities in the field of technology, because it

cannot be denied that in the scope of education, technology is definitely needed as one of the main elements in improving learning activities.

Author Contributions

All authors have sufficiently contributed to the study, and agreed with the results and conclusions.

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Declaration of Competing Interest

No conflict of interest is declared by authors.

References

- Akker, J.V.D. (1999). Principles and methods of development research. dalam (Eds). Design approaches and tools in education and training. Dordrecnt: Klower Academic Publirs.
- Anjarsari, E. (2019). Faktor Permasalahan Pendekatan Saintifik 5M Dalam Pembelajaran Matematika Di Sma. *Vygotsky*, 1(1), 12. <https://doi.org/10.30736/vj.v1i1.88>
- Anjarsari, E., Farisdianto, D. D., & Asadullah, A. W. (2020). Pengembangan Media Audiovisual Powtoon Pada Pembelajaran Matematika Untuk Siswa Sekolah Dasar (Development of Audiovisual Based Powtoon Media in Mathematics Learning for Elementary School Students). *JMPM: Jurnal Matematika Dan Pendidikan Matematika*, 5(2), 40-50.
- Juliana, Erviyenni, & Rini. (2017). Pengembangan media pembelajaran berbasis powtoon pada pokok bahasan struktur atom di kelas x sma/ sederajat. *Jurnal Online Mahasiswa Fakultas Keguruan dan Ilmu Pendidikan*, 4(2), 1-10.
- Liesdiani, D., Syaodih, E., & Mariam, P. (2016). Pengembangan multimedia pembelajaran berbasis audio visual powtoon untuk meningkatkan motivasi belajar. *JP2EA: Jurnal Pendidikan dan Pembelajaran Ekonomi Akuntansi*, 2(2): 139-149.
- Maharani, S., & Bernard, M. (2018). Analisis Hubungan Resiliensi Matematik Terhadap Kemampuan Pemecahan Masalah Siswa Pada Materi Lingkaran. *JPMI (Jurnal Pembelajaran Matematika Inovatif)*, 1(5), 819. <https://doi.org/10.22460/jpmi.v1i5.p819-826>
- Mann, E. L. (2009). The search for mathematical creativity: Identifying creative potential in middle school students. *Creativity Research Journal*. <https://doi.org/10.1080/10400410903297402>
- Musfiqon. (2019). Pengembangan media belajar dan sumber belajar. *Jakarta: Prestasi Pustakakarya*.
- One. (2017). Efektivitas penggunaan media pembelajaran audiovisual powtoon dalam meningkatkan motivasi belajar siswa di madrasah aliyah. *Jurnal Pendidikan dan Pembelajaran Khatulistiwa*, 6(3).
- Safitri, M., Hartono, Y., & Somakim, S. (2013). Pengembangan Media Pembelajaran Matematika Pokok Bahasan Segitiga Menggunakan Macromedia Flash Untuk Siswa Kelas Vii Smp. *Jurnal Pendidikan*. <https://doi.org/10.33830/jp.v14i2.358.2013>

- Sugiyono. (2016). *Metode Penelitian dan Pengembangan (Research and Development/R&D)*. Bandung: Alfabeta.
- Suhendra, I., Enawaty, E., & Melati, H. A. (2018). Pengaruh penggunaan media audiovisual powtoon terhadap motivasi dan hasil belajar siswa materi unsur senyawa campuran. *Jurnal Pendidikan dan Pembelajaran Khatulistiwa*, 7(3), 1-8.
- Syaodih, N. (2014). *Penelitian Deskriptif Kualitatif*. Tripven.
- Studi, P., Ekonomi, P., Pendidikan, J., Pengetahuan, I., Fakultas, S., & Dan, K. (2022). *Pengaruh Penggunaan Media Quizizz*. 3(2), 101-114.
- van den Akker, J. (1999). Principles and Methods of Development Research. *Design Approaches and Tools in Education and Training*, 1-14. https://doi.org/10.1007/978-94-011-4255-7_1
- Widiana, I. W., & Jampel, I. N. (2016). Improving Students' Creative Thinking and Achievement through The Implementation of Multiple Intelligence Approach with Mind Mapping. *International Journal of Evaluation and Research in Education (IJERE)*. <https://doi.org/10.11591/ijere.v5i3.4546>