Development Of Interactive Multimedia Based Articulate Storyline 3 on The Main Discussion Volume of Space Building at Ulil Albab Caruban Primary School

Melingga Nabilla Hidayat*, Agus Wedi, Muhibuddin Fadhli

State University of Malang, Jl. Semarang No. 5 Malang, East Java, Indonesia

*Author of correspondence, Email: melingga.nabilla.2001216@students.um.ac.id

Abstract

The aim of this research is to develop interactive multimedia based Articulate Storyline 3 on the subject of building volume, and to assess the feasibility and effectiveness of the product. The development model used is ADDIE (Analyze, Design, Development, Implementation, Evaluation) developed by Robert Maribe Branch. The product that has been developed is tested for validity by media experts and material experts, after which it is tested on class VI students at SD Ulil Albab Caruban. The validity test results of media experts showed a value of 88.09% and material experts showed a value of 91.67%. The results of the trial on 30 students showed a score of 81.33%. Meanwhile, the effectiveness test carried out has a significant difference because Sig. (2-tailed) has a value of 0.000 less than 0.05 which shows that there is a difference between pre-test and post-test. From this description it can be concluded that the interactive multimedia developed is valid and effective for use in learning.

Keywords: Interactive Multimedia, Articulate Storyline, Volume Build Space

1. Introduction

The rapid development of technology in human civilization today has led to various changes in life. At the time society 5.0 technology can be applied to various sectors, such as the financial, government, legal, trade, health, education and so on. Various innovations continue to emerge from various fields, including the field of education which has undergone significant transformation. Learning technology according to the AECT (2012) definition is defined as a field of study related to the use of tools and media, as well as methods and processes that facilitate human learning. It includes the design and development of learning systems, the use and management of instructional technology, and related evaluation and research.

The Ministry of Education, Culture, Research and Technology (Kemendikbud Ristek) has released a mathematics score that in 2022 reached 366, but experienced a decline where in 2018 it reached a score of 379. Even though the PISA score has decreased, Indonesia's mathematics literacy learning outcomes ranking has increased by 5 positions compared to PISA 2018 due to the use of technology in learning.

Based on data released from the Central Statistics Agency through the March 2022 Susenas survey, as many as 39.97% of children aged 5 to 6 years at elementary school level have accessed the internet. This shows that technology can now be maximized as an active learning medium. Active learning provides an impressive learning experience for students, meaning that students are given the freedom to be involved and understand what they are learning and the purpose of their learning. There are various strategies that can be used to

implement active learning, one example is the use of learning media that involves student activity.

One example of the use of technology and learning media is the emergence of interactive multimedia. According to Robin and Linda (in Benarto, 2011) interactive multimedia is a tool that can create interactive and dynamic presentations, with a combination of text, audio, animation, graphics, images and video. Interactive multimedia can be applied to various subjects, one of which is mathematics. Various relevant studies conclude that interactive multimedia in mathematics learning can improve problem-solving habits in students (Sattriawan, et al. 2020; Silviyani, et al., 2020; Fariz, et al., 2022).

Thousand software for creating interactive multimedia is now widely circulated in the global community or society. A number of software very familiar to use, but some are quite difficult to use. There are several ways to choose software which is right in developing interactive multimedia. Darmawan (2016) says when Articulate Storyline is an application powered by brainware intelligent simple in interactive tutorial procedures to help users format CDs, word processors, web and personal, with templates released online online nor offline.

Researchers conducted observations and interviews with several students and class teachers at SD Ulil Albab Caruban, so they could conclude that, on average, students had difficulty understanding mathematics lessons. So they feel bored which results in students' lack of interest in learning mathematics. Volume material is material that is difficult to understand because there is no supporting media, only using printed books from school. School facilities and infrastructure really support the use of interactive multimedia. There is a computer laboratory and LCD projector in each class. However, existing facilities and infrastructure have not been utilized effectively. In the learning process, the teacher only uses the lecture method and then gives questions.

Based on the background that has been described, the researcher concludes that it is necessary to develop interactive multimedia which contains several elements such as a combination of text with images and colors. Of the many software circulating, Articulate Storyline 3 can answer this problem. This development aims to produce interactive multimedia based Articulate storyline 3 on the subject of building volume at SD Ulil Albab Caruban which can help students understand the material and improve the quality of learning. Meanwhile, the aim of this development is to find out the validity and effectiveness of the media that has been developed and applied in learning. It is hoped that interactive multimedia can increase students' learning motivation as well as students' active role both during classroom learning and independent learning.

2. Method

This research is types of research and development that can be mentioned *Research and Development (R&D).* According to Setyosari (2016:284) research and development is an industry-based (results) research model, because it has the aim of producing a product or procedure through planned testing and evaluation to achieve certain criteria of effectiveness, quality and standards.

The development model used in this research is The procedural model developed by Robert Maribe Branch (2009), namely the ADDIE model, has five stages, namely Analysis *(Analyze)*, Design *(Design)*, Development *(Development)*, Implementation *(Implementation)*, and Evaluation *(Evaluation).* The ADDIE model is a model that can adapt well to many situations and can be used today. Meanwhile, the ADDIE model provides a systematic framework so that the development of instructional interventions also includes evaluation and revision of each stage (Angko, 2017).

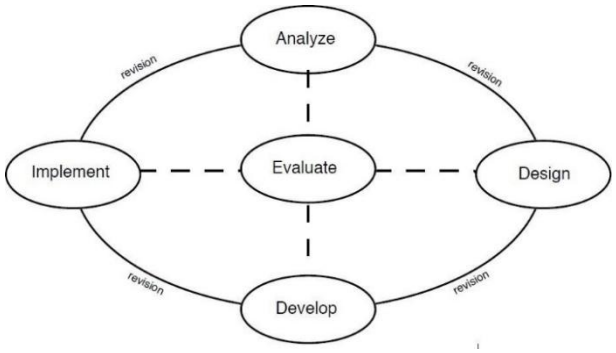

Figure 1. Stages of the ADDIE Model

Analysis *(Analyze)*

Level of analysis or *analysis* is an important initial stage in product development to determine the direction of further development. Aims to determine the needs and goals of product development, student characteristics, and existing resources. At this stage, interviews were carried out with the class teacher and class VI students at SD Ulil Albab Caruban. The interview was conducted offline at Jalan Haji Agus Salim No.1, Krajan, Mejayan District, Madiun Regency, East Java Province. Information was obtained regarding students' problems with difficulty understanding the material because there was no supporting media, only using printed books from school. Apart from that, at this stage, identification of the learning environment is carried out to find suitable products to be developed, such as supporting infrastructure and resources. Product development planning is carried out based on analysis of the information that has been obtained so that the need for interactive multimedia development can be determined.

Design *(Design)*

According to Branch, the design stage begins with a work plan regarding a description of what will be made, how it will be made, and how it will be used to achieve learning objectives. Interactive multimedia is made as interesting as possible by using supporting tools, materials and facilities. Interactive multimedia design based *Articulate Storyline 3* which contains the subject matter of building volumes which will be packaged according to learning objectives and student needs.

Development *(Development)*

The development stage is the stage of making a product that has been designed in the design stage. At this stage there is also a process of creating manuals or guidelines for teachers and students. Meanwhile, in this stage, product revisions are carried out by media and material

experts if there are deficiencies in the product during the development process, followed by testing the function and suitability of the product by educators, namely mathematics subject teachers at SD Ulil Albab Caruban so that they can identify whether the media is suitable for implementation in the classroom. . Then, based on the validation results from experts, small group implementation is then carried out.

Implementation *(Implementation)*

The implementation stage is the stage that includes delivering the product to teachers and students. After receiving further validation, it can be implemented in a large group, namely all class VI students at SD Ulil Albab Caruban. To find out the practicality and effectiveness of the product, students are asked to work on questions *pretest* or *post-test* as well as commenting on the media has been implemented by filling out a student response validation questionnaire sheet.

Evaluation *(Evaluation)*

The evaluation or evaluation stage is the final stage in the ADDIE development model. This stage is carried out in order to measure and assess the quality of the product being developed. The selection of assessment criteria is carried out to find out the results of validation questionnaires by experts and the results of questionnaires from students, to revise or improve the product according to the evaluation results or if there may be things that have not been fulfilled in the interactive multimedia product. Apart from that, at this stage students' learning outcomes can be known *pre-test* as well as *post-test* as a reference if the product being developed has differences in learning outcomes.

3. Results and Discussion

3.1 Result

The product resulting from this development and research is in the form of interactive multimedia with the name "ROOM MATH". In this media, the topic of volume of space for class VI elementary school is discussed. This interactive multimedia includes menu pages, developer information, usage instructions, learning objectives pages, material pages, games and evaluations.

Figure 2. Product Display Design

Validation tests by material experts and media experts are carried out after the product has been developed by providing pre-designed questionnaires to both material experts and media experts. Media expert validation is carried out with the aim of assessing the feasibility and quality of the learning media that has been developed. Meanwhile, material expert validation is carried out with the aim of measuring the quality of the content and objectives of the product that has been developed, as well as to assess the suitability of the material to basic competencies and the correctness of the concept. The results of the validation tests are used to determine the level of validity of products developed with the following qualifications:

Table 1. Validity Level Qualifications

Percentage (%)	Validity Level	Equivalent
81 - 100	Very valid	Very worthy
61 - 80	Valid	Worth it
41 - 60	Fairly valid	Decent enough
21 - 40	Not valid	Not Worth It
< 20	Very invalid	Very inadequate

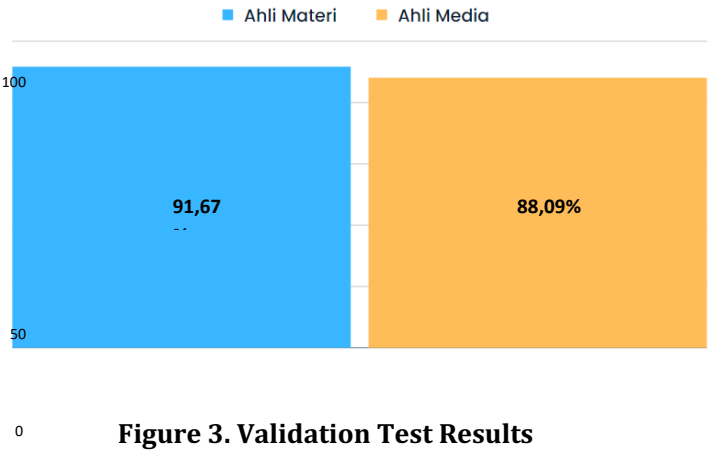

Figure 3. Validation Test Results

The results of the validation test by material experts are shown in the diagram in Figure 3, showing the results of the validation percentage of material experts, the result was 91.67% based on the results of the validation data in the table above with a total of 15 statements. A total of 10 statement items received Very Suitable answers with a score per item of 4.00. A total of 5 statements received answers in accordance with a score per item of 3.00. Based on the results of material expert validation, conclusions can be drawn if the interactive multimedia being developed is called **Very Valid And Very Worth It** to be applied to learning.

Table 2. Details of Material Validation Results

Aspect	Score/Max Score	Percentage (%)	Criteria
Content Quality	29/32	90,65	Very Worth It
Quality of learning	15/16	93,75	Very Worth It
Language quality	11/12	91,67	Very Worth It
Total	**55/60**	**91,67%**	**Very Worth It**

The media expert validation test results shown in the diagram in Figure 3 show that the media expert validation percentage results were 88.09% based on the validation data results in the table above with a total of 21 statements. A total of 11 statement items received Very Suitable answers with a score per item of 4.00. A total of 10 statements received answers in accordance with a score per item of 3.00. Based on the validation results from media experts, it can be concluded that the interactive multimedia developed is said to be very feasible and very valid to be applied to learning.

Table 3. Details of Media Validation Results

Aspect	Score/Max Score	Percentage (%)	Criteria
Display Design	37/40	92,50	Very Worth It
Audio	10/12	83,33	Very Worth It
Video	10/12	83,33	Very Worth It
Animation	6/8	75,00	Worth it
User Convenience	11/12	91,67	Very Worth It
Total	**74/84**	**88,09%**	**Very Worth It**

After validation and feasibility testing were carried out by material expert validators and media experts, media trials were carried out on users, namely students. The trial was carried out by 30 class VI students at SD Ulil Albab Cauban.

Table 4. Details of Student Response Results

Aspect	Score/Max Score	Percentage (%)	Criteria
Presentation of Material	489/600	81,50	Very Worth It
Media Display	487/600	81,17	Very Worth It
Total	**976/1.200**	**81,33%**	**Very Worth It**

From the results of the percentage of field trials, the results obtained were 81.33%, so it can be concluded that based on the score criteria that have been determined that the RUANGMATH interactive multimedia that has been developed is said to be very valid and very feasible. to be applied in learning.

Learning outcome data was obtained from *pre-test* and *post-test* to 30 class VI students at SD Ulil Albab Caruban. Each test provides different information and can help to increase learning effectiveness. A summary of the learning outcomes of class VI students at SD Ulil Albab Caruban is presented in Table 5.

Table 5. Statistical Data on Student Learning Outcomes

		PRESTEST	POSTTEST
N	**Valid**	30	30
	Missing	0	0
Mean		63.50	87.67
Median		62.50	87.50
Mode		60	85
Std. Deviation		10.517	7.038

From the results of statistical tests with a total of N of 30, an average of 30 was obtained *pre-test* 63,50. The pretest test data has a median of 62.50 and a mode of 60 with a standard deviation of 10.517. On test *post-test* obtained an average of 87.67 from a total of N of 30. Test data *post-test* has a median of 87.50 and a mode of 85 with a standard deviation of 7.038. In this test it can be seen that the average *pre-test* and *post-test* there is a total increase of 27.56%. This proves when the product is developed **Effective** to be used in learning. The results of statistical analysis for student learning outcomes data are expressed in stages.

Data Normality test is carried out to find out whether the data obtained is normally distributed or not. In parametric statistics, normally distributed data is the main absolute requirement for carrying out subsequent tests. The normality test used applies the Shapiro-Wilk normality test.

Table 6. *Tests Of Normality*

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	**df**	**Say.**	**Statistic**	**df**	**Say.**
PRESTEST	.130	30	.200*	.956	30	.239
POSTTEST	.152	30	.073	.937	30	.078

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Based on the results of the normality test on the data *pre-test* The data obtained was normally distributed because the Sig. 0.239 is greater than 0.05. On data *post-test* Also obtained were normally distributed data due to the Sig value. 0.078 is greater than 0.05.

Hypothesis testing is carried out through paired sample T-Test analysis using *software* SPSS 25. analysis results are described in Table 7.

Table 7. *Paired Samples Correlation*

		N	Correlation	Say.
Pair 1	**PRIEST TEST & POSTAL TEST**	30	.743	.000

Based on the output results, in the table above it appears that there is a correlation between variables *pre-test* as well as *post-test* where the correlation coefficient value has a strong positive relationship of 0.743 with a significance value of 0.000. Because the sig value < probability 0.05, it can be concluded that there is a relationship between variables *pre-test* and *post-test.*

Table 8. *Paired Samples Test*

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	**PRIEST TEST - MAIL TEST**	-24.167	7.081	1.293	-26.811	-21.522	-18.693	29	.000

In the Paired Sample T-Test data test *pre-test* as well as *post-test* has a Correlation value of 0.743 and a Correlation Significance of 0.000. The data of learning outcomes that were tested have significant differences because Sig. (2-tailed) has a value of 0.000 less than 0.05. So it can be concluded that there is a difference between *pre-test* as well as *post-test*, effective interactive multimedia to be applied to learning.

3.2 Discussion

The development of interactive multimedia has an important role as a medium that makes learning easier for students by collaborating with all types of media, so that students can interact with simulations and evaluations in the media. The interactive multimedia ROOM MATH raises the subject of the volume of space according to the results of observations and interviews with teachers and students at SD Ulil Albab Caruban. The results of observations and interviews show that the average student has difficulty learning mathematics, especially

in the volume of space material. Teachers are used to using lecture methods and textbooks that have minimal pictures and colors. However, students expect media that has lots of pictures and colors to increase their interest in learning. The facilities and infrastructure at the school already support learning with interactive multimedia so that development can continue to the next stage.

The next stage is designing the product to be developed, namely interactive multimedia. In this stage, the material presented in the media is consulted with mathematics subject teachers. Next is the product development stage by compiling storyboard and continues to the media production stage using software Articulate Storyline 3 according to the material that has been designed.

Furthermore, the media that has been developed is validated by material experts and media experts in order to measure the suitability of the media that has been developed. The results of the validation test from material experts show a positive response with a percentage of 91.67% and it can be said that the media is very valid without any revisions, provided that the media is good, however, for further development, the explanation in the video is better to provide animation in accordance with the existing explanation so that more understandable. The material aspect is appropriate and for further development you can add videos about formulas or examples of story questions and calculations. Meanwhile, the validation test from media experts also received a positive response with a percentage of 88.09% and it was said that the media was very valid but there were revisions, namely to provide question numbers in the evaluation section and give marks on the game page. Based on the validation results, the interactive multimedia developed is said to be valid and suitable for use in the field.

After validation by experts, the next stage is field trials. In the field trial stage carried out by 30 students at SD Ulil Albab Caruban. Before the media is tested, students are asked to work on questions pre-test a total of 20 multiple choice questions to measure students' initial knowledge. Next, the media is tested on students by being given guidance first and then students can operate it independently. The next stage is giving questions post-test a total of 20 multiple choice questions to measure students' understanding after using the media. From the results pre-test and post-test there was an increase in learning outcomes with an average pretest score of 63.50 and an average post-test score of 87.67. Based on statistical tests, namely paired sample T-Test, the learning outcome data has significant differences due to Sig. (2-tailed) has a value of 0.000 less than 0.05. So it can be stated that the media is very effective to apply in learning.

Meanwhile, the interactive multimedia RUANG MATH also received a positive response from students. According to the results of the questionnaire and student responses after using the media, the percentage was 81.33%. Students also noted that the material presented was easy to understand and the media was easy to use, but students suggested adding a back button to the evaluation page because answers were usually not filled in or missed. From the description that has been explained, it can be concluded that the interactive multimedia developed is very valid and effective so that it can be used in learning, including at school or outside school, namely independently by students.

4. Conclusion

RUANG MATH interactive multimedia according to research results shows that interactive multimedia is based Articulate Storyline 3 considered very valid and effective which is one of the student learning media. Proven by validation results by material experts and media experts. Meanwhile, interactive multimedia also received a positive response from students after testing. Student learning outcomes before and after using media also show a significant increase. Based on these results, it can be concluded that the interactive multimedia ROOM MATH is very valid and effective in learning.

References

Alti, R. M., Anasi, P. T., Silalahi, D. E., Fitriyah, L. A., Hasanah, H., Akbar, M. R., ... & Kurniawan, A. (2022). Media Pembelajaran. Get Press.

Angko, N. (2017). Pengembangan bahan ajar dengan model addie untuk mata pelajaran matematika kelas 5 SDS Mawar Sharon Surabaya. Kwangsan: Jurnal Teknologi Pendidikan, 1(1), 1-15. DOI: 10.31800/jtp.kw.v1n1.p1--15

Arsyad, Azhar. (2011). Media Pembelajaraan. Jakarta: PT. Raja Grafindo Persada.

Arwanda, P., Irianto, S., & Andriani, A. (2020). Pengembangan Media Pembelajaran Articulate Storyline Kurikulum 2013 Berbasis Kompetensi Peserta Didik Abad 21 Tema 7 Kelas IV Sekolah Dasar. Al-Madrasah: Jurnal Pendidikan Madrasah Ibtidaiyah, 4(2). DOI: 10.35931/am.v4i2.331

Branch, R. M. (2009). Instructional design: The ADDIE approach (Vol. 722). New York: Springer.

Darmawan, D. (2016). Mobile learning: Sebuah aplikasi teknologi pembelajaran. PT. Raja Grafindo Persada.

Dewi, I. P., Sofya, R., & Huda, A. (2021). Membuat Media Pembelajaran Inovatif dengan Aplikasi Articulate Storyline 3. UNP PRESS. DOI: 10.17977/um062v3i102021p790-799

Dewi, I. P., Sofya, R., & Huda, A. (2021). Membuat Media Pembelajaran Inovatif dengan Aplikasi Articulate Storyline 3. UNP PRESS.

Djajanegara, A. R. (2019). Teknik Analisis Data (Analisis Kualitatif Pada Hasil Kuesioner). Medikom| Jurnal Ilmu Pendidikan dan Dakwah, 1(1), 55-65.

Fariz, R., & Dewi, N. R. (2022, February). Kajian Teori: Pengembangan Media Pembelajaran Interaktif Berbantuan Articulate Storyline 3 pada Model Preprospec Berbantuan TIK untuk Meningkatkan Kemampuan Pemecahan Masalah Matematis. In PRISMA, Prosiding Seminar Nasional Matematika (Vol. 5, pp. 304-310).

Fauzi, A. A., Kom, S., Kom, M., Budi Harto, S. E., Mm, P. I. A., Mulyanto, M. E., ... & Rindi Wulandari, S. (2023). Pemanfaatan Teknologi Informasi di Berbagai Sektor Pada Masa Society 5.0. PT. Sonpedia Publishing Indonesia.

Hilir, A., & Kom, S. (2021). Pengembangan Teknologi Pendidikan Peranan pendidik dalam menggunakan media pembelajaran. Penerbit Lakeisha.

Huda, I. A. (2020). Perkembangan teknologi informasi dan komunikasi (TIK) terhadap kualitas pembelajaran di sekolah dasar. Jurnal Pendidikan Dan Konseling (JPDK), 2(1), 121-125. DOI: 10.31004/jpdk.v1i2.622

Indriana Dina, Ragam Alat Bantu Media Pengajaran (Jakarta: PT. Diva Press. 2011), 15.

Iskandar Wiryokusumo dalam Afrilianasari.2014 Teori Pengembangan, Surabaya

Ismail, M. I. (2020). Teknologi pembelajaran sebagai media pembelajaran. Cendekia Publisher.

Istyadji, M., Yulinda, R., & Amalina, D. (2022). Validity and Practicality of Articulate Storyline Learning Media on Environmental Pollution Materials for Junior High School Students. Jurnal Penelitian Pendidikan IPA, 8(6), 2599-2604. DOI: 10.29303/jppipa.v8i6.1639

Karo-Karo, I. R., & Rohani, R. (2018). Manfaat media dalam pembelajaran. AXIOM: Jurnal Pendidikan Dan Matematika, 7(1). DOI: 10.30821/axiom.v7i1.1778

Kementerian Pendidikan dan Kebudayaan. 2023. Peringkat dan Capaian PISA Indonesia. Jakarta: Biro Komunikasi dan Layanan Masyarakat Kementerian Pendidikan dan Kebudayaan

M. Atwi Suparman, & Aminudin Zuhari. Pendidikan Jarak Jauh Teori dan Praktek, (Jakarta: Pusat Pernerbitan universitas Terbuka, 2004) h, 26

Nugroho, F., & Arrosyad, M. I. (2020). Learning multimedia development using articulate storyline for students. International Journal of Elementary Education, 4(4), 575-579.

Rahmat, S. T. (2015). Pemanfaatan multimedia interaktif berbasis komputer dalam pembelajaran. Jurnal Pendidikan dan Kebudayaan Missio, 7(2), 196-208. DOI: 10.36928/jpkm.v7i2.35

Rusydiyah, E. F. (2021). Pembelajaran Aktif di Era Pembelajaran Digital.

Sadiman, Arief S dkk. 2018. Media Pembelajaran: Pengertian, pengembangan dan pemanfaatannya. Depok: Rajawali Pers

Saputro, P. A., & Lumbantoruan, J. H. (2020). Pengembangan Media Pembelajaran Matematika Berbasis Articulate Storyline Pada Materi Bangun Ruang Sisi Datar Kelas VIII. EduMatSains: Jurnal Pendidikan, Matematika Dan Sains, 1(1), 35-49. DOI: 10.33541/edumatsains.v1i1.2453

Sari, R. I. (2021). Pengembangan media pembelajaran matematika menggunakan teknologi augmented reality (AR) pada materi bangun ruang sisi lengkung. In Skripsi.

Setyosari, H. P. (2016). Metode penelitian pendidikan & pengembangan. Prenada Media.

Sindu, I. G. P., Santyadiputra, G. S., & Permana, A. A. J. (2020). The effectiveness of the application of Articulate Storyline 3 learning object on student cognitive on Basic Computer System courses. Jurnal Pendidikan Vokasi, 10(3), 290-299. DOI: 10.21831/jpv.v10i3.36094

Sumiharsono, R., & Hasanah, H. (2017). Media pembelajaran: buku bacaan wajib dosen, guru dan calon pendidik. Pustaka Abadi.

Vaughan, T. (2011). Multimedia: Making It Work 8th Edition. New York: McGraw-Hill.

Wibawanto, W., & Ds, S. S. M. (2017). Desain dan pemrograman multimedia pembelajaran interaktif. Cerdas Ulet Kreatif Publisher