

Development of Length Measurement Materials using Adobe After Effects

Uswatun Chasanah^{1*}, Aninditya Sri Nugraheni¹ & Mazarul Hasan Mohamad Hanapi²

¹Universitas Islam Negeri Sunan Kalijaga Yogyakarta, Yogyakarta, Indonesia

²University Pendidikan Sultan Idris, Tanjung Malim, Perak, Malaysia

*Email: 20204081015@student.uin-suka.ac.id

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| Keywords: | Abstract |
|---|---|
| <p><i>mathematics material</i></p> <p><i>length measurement</i></p> <p><i>Adobe After Effects</i></p> | <p><i>This study aimed to (1) produce a video of length measurement material through Adobe After Effects software, (2) determine the validity and feasibility of the developed video, (3) knowing the student's response to the video length measurement material. This study used the Research and Development (R&D) method, which was modified from the 4D model, data collection techniques by observation, interviews, questionnaires, and documentation. The data analysis technique was done by converting qualitative data into quantitative data. The quality of the video development of length measurement material based on the assessment of mathematicians scored 5.0 with a good predicate, learning media experts got a score of 4.7 with a good predicate, and linguists got a score of 4.75 with an appropriate predicate. The teacher's assessment obtained a score of 5.0 with a felicitous predicate. The results of the limited video trial obtained a percentage of 100%, meaning that the average student gave a positive response to the material developed in the video.</i></p> |

INTRODUCTION

Background

Mathematics subjects are one of the exact subjects that learners often fear, not infrequently learners feel difficulty understanding mathematical materials, low grades. Maloney and Beilock's research from the department of psychology explained that elementary school-age children tend to experience mathematics anxiety; this anxiety can harm the cognitive aspects of learners (Maloney & Beilock, 2012). Material objects in mathematics are still abstract; this can trigger difficulties experienced by low-class learners when learning or understanding mathematical materials (Mashuri, 2019, p. 1). The most prominent problem factors are differences in the level of understanding and the level of independence of learners. Teachers have difficulty explaining mathematical materials to

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learners due to a lack of props or learning media. Learners also find it challenging to understand the mathematical material being studied, so they have not been able to solve mathematical problems appropriately, such as learners' accuracy in answering math problems (*Hasil Analisis Kebutuhan*, 2020). Though math learning is currently more inclined to learning critical thinking and creative thinking, the reality is that not all learning devices contain stimuli so that learners can think critically and creatively (Siswono, 2018, p. 5).

Problem of Study

Mathematical learning is identical to learning implementation to support learners in developing and improving the creative thinking process and the ability to process new knowledge so that mathematical learning materials can be mastered easily (Susanto, 2019, p. 194). The study results showed that as many as 42.2% of learners think critically, 44.3% can think, and 10.3% cannot think critically. However, these results certainly do not represent all indicators of critical thinking (Azizah et al., 2018). So For the objectives of learning mathematics, teachers can provide memorable experiences for students during the learning process in class through building learning activities that can encourage and provide problem-based challenges for students. Mathematics material is identical to the analysis of a problem Educate (Novita & Putra, 2016). For this reason, developing mathematical materials through a variety of strategies, props, or learning media is very important to do.

State of the Art

This research will utilize learning media in interactive multimedia to overcome these problems. The learning media acts as a container to serve or explain a learning material clearly so that learning goals can be fulfilled following expected (Kustandi & Darmawan, 2020, p. 6). Previous research revealed that learners could easily understand mathematical concepts by utilizing interactive multimedia than conventionally (Novitasari, 2016). Previous research has proven that developing *Powtoon* animations in mathematics can improve students' understanding (Awalia et al., 2019), develop appropriate interactive multimedia in mathematics learning (Istiqlal, 2017), and develop mathematics learning videos *through the Sparkill video* clerk application. Furthermore, it can be applied in learning (Fadillah & Bilda, 2019). The use of video in learning impacts learners, and learners get new experiences or new experiences. Video can affect the minds and emotions of students. (Yudianto, 2017).

In addition, Hikmah and Purnamasari conducted research by developing an animated video "Bang Dasi" flat build material class V using the *Camtasia* application. The study received a percentage from media experts of 93.3% and 96.86% of material experts. Therefore, the resulting video deserves to be used as a learning medium (Hikmah & Purnamasari, 2017). Wisada et al. have also developed a character education-oriented learning video. Using the ADDIE model, the results of the validity of material experts are 98.3%, learning design experts 93.3%, learning media experts 96.5%, trials on each 94.53%, limited trials 92.32%, and trials 91% area. So that can be stated that the video can improve the ability of 10th-grade learners B (Wisada et al., 2019). Students will get direct experience with learning media; direct experience can provide special meaning (Rusman, 2018, p. 168). Thus, mathematical materials will be more easily conveyed, and learners can digest them properly and precisely.

The explanation is in line with Piaget's theory that learners with the age range of 7-11 years can already think systematically through objects or a concrete event (Syah, 2019, p. 72). Therefore, these characteristics become an essential foundation for learning media to explain mathematical materials. Kurniawan et al. revealed in the results of his research that the application of video in learning was considered adequate, proven *posttest* results of learners obtained a percentage of 94.4% with previous *pretest* results obtained a

percentage of 75% (Kurniawan et al., 2018). Agree with the theory in his book Prastowo (Prastowo, 2015, p. 302); Mell Silberman argues that affixing visuals in learning can increase the memory of learners from 14% to 38%; the time used to explain is reduced by up to 40% to increase effectiveness and time efficiency during learning. However, several points must be considered in developing learning videos, Smaldino, Lowther, and Russell suggest there are two aspects: elements in visuals and elements in the text. Visual elements include the setting, balance, color, easy-to-read, and attractiveness. At the same time, text elements are more inclined to the characteristics of letters used, such as text style, letter size, spacing, color in the text, and uppercase and lowercase letters (Smaldino et al., 2014, p. 78).

Gap Study & Objective

The development of mathematical materials *utilizes Adobe After Effects Software*. The material developed is measurement material in math class 2 SD / MI to overcome the problems at hand. *Adobe After Effects* is commonly used for Motion Graphic *Design* (Maharani & Hotami, 2017). *Adobe After Effects* can manipulate text, images, audio, or video. *Adobe After Effects* can also be combined with other *Adobe* products such as *Photoshop*, *Illustrator*, and *Premiere Pro* (Smith & AGI Creative Team, 2012, p. 1). Students learning contributions gain a significant influence when using learning media during the learning process; 90.1% of learning media affect learners' learning outcomes (Mujiani, 2016). The results of Busyaeri's research et al. also showed that learning outcomes increased if teachers often used learning videos (Busyaeri et al., 2016). Based on this explanation, this study aimed to produce a video-based mathematical material development product through *Adobe After Effects*, determine the feasibility of developing video-based mathematics material through *Adobe After Effects*, and determine the responses given by students to the learning videos that have been developed.

METHOD

The research method used is *Research and Development (R&D)* (Saputro, 2017, p. 8), namely developing math materials in grade 2 SD/MI through *Adobe After Effects software* in the form of video learning materials. Development process adapting 4D models (*Define, Design, Development, and Desiminate*) (Mulyatiningsih, 2013, p. 195). This research is limited to finding out the feasibility of the product development of math materials grade 2 SD/MI through *Adobe After Effects*, so this development only reaches the third stage (*Define, Design, dan Development*). The population and sample of this study were randomly presented, namely students of the 2nd grade of elementary school and madrasah ibtidaiyah, taken ten people for a limited trial. At *the define* stage, researchers conduct needs analysis, teachers, learners, and curriculum analysis through observation and interviews. For the *design* stage, researchers began to determine and design interactive multimedia learning media in the form of videos containing mathematical materials about long measurements. Lastly, researchers began to conduct validates on videos developed in the development stage. Valid tests are conducted by mathematicians, learning media experts, and Indonesian experts. Researchers use input or criticism from experts as material to revise products that have been developed to be better. In addition, this video product is also assessed by peer *reviewers*, namely teacher class. Product trials are conducted on a limited basis with the target of 2nd grade SD/MI learners.

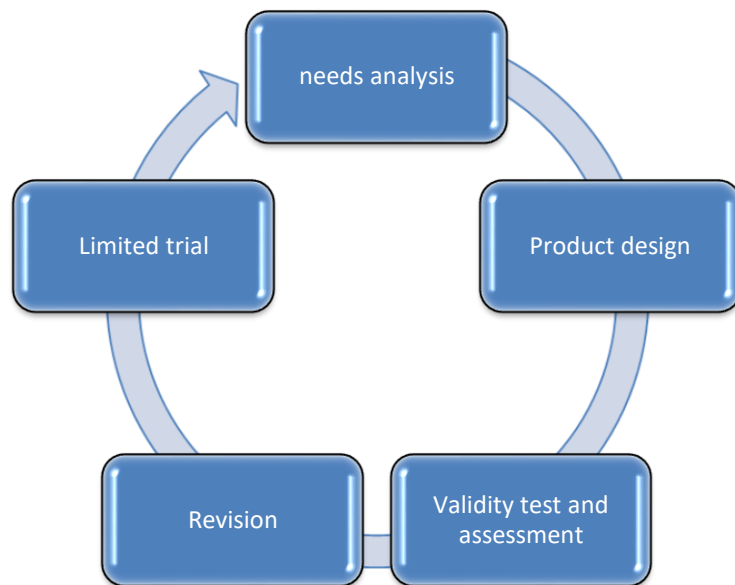


Figure 1. Product Development Process Scheme

Product eligibility is determined by the results of validation tests and assessments conducted by mathematicians, learning media experts, and linguists, at least obtaining a Good (B) score with an average score of > 3.4 to 4.2 . Because the learning was done online, the study took random populations and samples, where limited trials were not conducted at one point. Researchers developed the instrument used for validating and assessing video products from the theoretical foundation used in this development, guided by the theory in his book Smaldino et al. (Smaldino et al., 2014, pp. 78–90). Research instruments use questionnaire sheets using *Likert scales and Guttman scales*. The *Likert scale* used for mathematical material experts, learning media experts, and peer reviewer assessment instruments combines material expert assessment instruments in mathematics, learning media experts, and linguists. Meanwhile, the response of learners using the *Guttman scale*. After that, the instrument is validated by the instrument expert.

Data collection techniques through observation, interviews, questionnaires, and documentation. Teknik data analysis by converting qualitative data into quantitative data. They were obtained from a questionnaire assessment of media experts, mathematicians, linguists, and peer reviewers. After converting into quantitative data, find the average score (Sudjana, 2014, p. 109) and convert it into qualitative assessment form by calculating the interval distance between the highest and lowest scores according to the Likert scale score suitable. Likewise, data analysis techniques for student responses are not much different, namely by changing or converting them into numerical (quantitative) and calculating positive-negative percentages according to the formula and percentage guidelines of learners' scores.

RESULT

The development of 2nd-grade math materials through *Adobe After Effects* resulted in a learning animation video containing math material theme 5 grade 2 SD/MI. This video was developed through adobe after effects software version 2020, then the results are uploaded in *Udemy Courses* and shared with the teacher of math subjects 2nd SD/MI. In addition to containing mathematical material about measuring the length of the theme of 5 grades 2 SD/ MI, this video product also contains problem exercises that learners can use to practice

and hone their skills. The resulting video takes the form of a learning animation accompanied by instrumental music and introductory sounds from researchers.



Figure 2. Material view

The material developed in this video is based on the teacher's book and the theme of the 5th grade SD/MI grade 2 SD/MI student book, as well as the Minister of Education and Culture Regulation Number 22 of 2016 concerning Standards for Primary and Secondary Education in order to keep it in line with the needs of students. In 5th grade 2 SD/MI, mathematical material describes the length measurement material. In addition to containing material about length measurements, problem examples, and problem exercises, this learning animation video also has a unique mascot named "Bubu." Bubu is a genius and clever monkey in solving problems and solving mathematical problems. The mascot is not just a picture but can move. Starting from Bubu came, Bubu spoke, until Bubu Returned. The hope is that Bubu can provide inspiration and motivation to students to be more passionate about learning mathematics because learners' level of learning motivation can impact the learning outcomes of learners (Lestari, 2017, p. 81).



Figure 3. "Bubu the Genius" Video Mascot



Figure 4. Bubun and Long Measurement Ladder

The duration of the video product resulting from this study did not reach 10 minutes to avoid saturation and boredom from learners because the nature of the video can be played repeatedly so that the duration of the video can be shortened, dense, and straightforward. The statement is reinforced by the opinion of Batubara and Ariani, preferably the video duration of about 3 to 5 minutes so that it is not too long (Husain & Ariani, 2016). The flexibility of size and settings of video utilization is one of the video's strengths. Other than that, learners are more accessible to absorb material from video than directly from printed teaching materials such as package books in general. The development of mathematical materials through Adobe After Effects has been validated and assessed by materials experts in mathematics, learning media experts, and linguists. The feasibility of the product in the form of animated videos containing long measurement materials is determined based on the results of the assessment of experts, namely material experts in the field of mathematics, learning media experts, and linguists who have been experts in each field (mathematics, learning media, and Indonesian language). Then, it is assessed by the classroom teacher (*peer reviewer*) and learners' responses. Experts' criticism and suggestions are used to revise the video of the long measurement material. Mathematicians get a score of 5.0 (excellent), a learning media expert gets a score of 4.7 (excellent), a linguist 4.75 (excellent), a classroom teacher gets a score of 5.0 (excellent), and a response from learners is worth 100% (positive).

DISCUSSION

This research only came to a limited trial, that is, the *development* stage, because of time constraints, so that it did not arrive at the product effectiveness test. All the data that has been collected is analyzed to find out and get a quality product and worth using. The following table guides average score conversion:

Table 1. Product Rating Category

| Average Score | Rating Category |
|---------------|-----------------|
| > 4,2 s/d 5,0 | Excellent |
| > 3,4 s/d 4,2 | Good |
| > 2,6 s/d 3,4 | Enough |
| > 1,8 s/d 2,6 | Less |
| 1,0 s/d 1,8 | Very lacking |

Source: (Widiyoko, 2018, p. 112)

Material expert instruments have two aspects: aspects of the 2013 curriculum and material characteristics. Aspects of the 2013 curriculum obtained a score of 5.0, and the distinctive aspect of the material obtained a score of 5.0.

Table 2. Score Results Per Aspect of Mathematical Materials Expert

| Aspects | Score | Rating Category |
|---------------------------|-------|-----------------|
| Curriculum 2013 | 5,0 | Excellent |
| Characteristics of matter | 5,0 | Excellent |

Based on the acquisition of data, it can be known that the results of validation of material experts obtained an average score of 5.0, namely the predicate "very good." The material's validation and expert assessment results indicate that the material presented in the video follows the core competency standards, essential competencies, and learning objectives in the theme of 5th grade 2 SD/MI. The material developed in the video also contains material based on facts, concepts, procedures, and principles. Lukman et al. argue that learning animation videos will be interesting if they are in the barrel with the material to be studied because it can add to the appeal and help learners understand the material easily (Lukman et al., 2019).

The instrument used in the product assessment results of "Development of Mathematical Materials Grade 2 SD/MI through *Adobe After Effect*" from the perspective of learning media experts has six aspects with details of score acquisition in the following table:

Table 3. Score Results Per Expert Aspect Mehe Learning

| Aspects | Score | Rating Category |
|-----------------------------|-------|-----------------|
| Characteristics of learners | 4,0 | Good |
| Compatible | 5,0 | Excellent |
| Safety and Resilience | 5,0 | Excellent |
| Display | 4,75 | Excellent |
| Text | 5,0 | Excellent |
| Audio | 4,5 | Excellent |

The conclusion of table 3 is that all aspects of getting the predicate or category "excellent," except the characteristic aspects of learners. Where the characteristic aspects of learners are "good." So that overall validation results from learning media experts get a score with an average of 4.7 predicated "very good." Learning media experts assess the distinctive aspects of learners are following the character of elementary school age, which is not dull and can support learners learning independently. However, the video will be more fun if the image on the material can move like a person talking. Learning videos are considered very compatible, meaning that learning videos are easy to use, easy to obtain, not expensive. Learning becomes effective and efficient because it can be played anytime and anywhere and accelerated or slowed down. The duration of learning is not wasteful time. If viewed in the specs of resilience and security, the learning video is safe to use because the content used does not deviate from the learning norm, is not easily damaged even though later the form of a CD, and can be utilized for an extended period.

As for the appearance aspect, learning media experts state that video design is creative, simple, modern (contemporary), and can arouse the interest of learning learners. Images and writing can be seen and read clearly, because the typefaces used to follow the sans serif

style, consistently, upright, and standard letter size. Selain that the impression of asymmetrical and balanced video display design can attract learners' attention. The reason is that the *background* colors do not interfere with the color of other components and the harmonization of colors in the background. In the video, the audio aspect also needs attention. Media experts assess the music of the intrusion, and the introductory sound can be heard clearly. The use of music in learning activities is considered to provide benefits such as providing calmness for learners, helping learners think clearly and develop creativity, and stimulating the efficiency of right-brain balance and left brain. (Halimah, 2010). Roffiq et al. also explained that music could affect aspects of learners' cognitive development and emotional intelligence (Roffiq et al., 2017). Therefore, researchers facilitated instrumental music in developing the video.

The assessment of linguists has two aspects: aspects of language style and authorship. Each aspect gets a different total score, as stated in the following table:

Table 4. Score Results Per Linguist Aspect

| Aspects | Score | Rating Category |
|----------------|-------|-----------------|
| Language style | 4,5 | Excellent |
| Authorship | 5,0 | Excellent |

Table 4 shows the validation of linguists getting an average of 4.75 "excellent" categories. Regarding aspects of language style, the vocabulary used is appropriate and reflects the meaning to be conveyed. It follows the rules of Indonesian but is not appropriate. The shortcomings became the material of researchers to revise grammar in the video and the selection of sentences used in the video language used, which is standard, clear, straightforward, and communicative. So that learners can easily absorb the messages contained in the video. At the same time, the authorship aspect shows that the writing of upper and lowercase letters is by the enhanced spelling (EYD). Linguists in this study aim to know the quality of grammar used so that the meaning contained in the video can be appropriately conveyed and precisely.

Validation results from all experts can be described in the following graph:

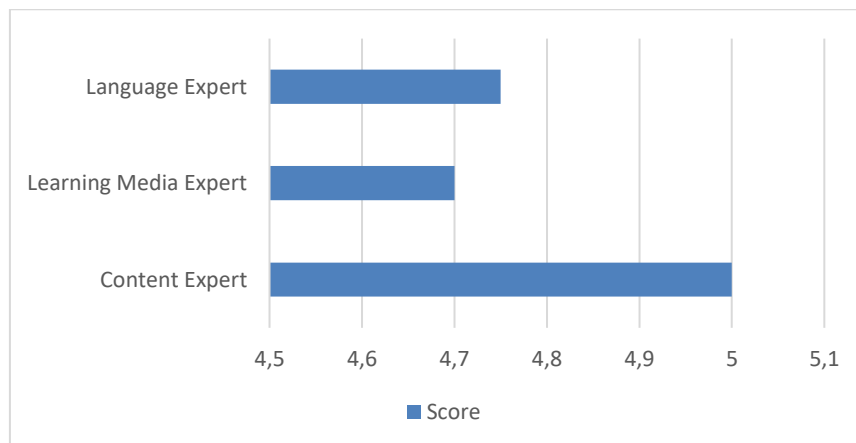


Figure 5. Validation Results Graph

The graph in figure 5 is an overview of product validation results based on experts' assessments. The graph shows that the video product is feasible and can be applied or tested to learners in learning.

According to the teacher's assessment results, the assessment of video material development using *Adobe After Effects software* can be tested on students. The teacher's assessment got an average score of r 5.0 with the perfect predicate.

Table 5. Score Results Per Aspect of Classroom Teacher

| Aspects | Score | Rating Category |
|-----------------------------|-------|-----------------|
| Curriculum 2013 | 5,0 | Excellent |
| Characteristics of matter | 5,0 | Excellent |
| Characteristics of learners | 5,0 | Excellent |
| Compatible | 5,0 | Excellent |
| Safety and resilience | 5,0 | Excellent |
| Display | 5,0 | Excellent |
| Text | 5.0 | Excellent |
| Audio | 5,0 | Excellent |
| Language style | 5,0 | Excellent |
| Authorship | 5,0 | Excellent |

It can be concluded from the results in table 5 that the video development of the material can be applied and tested to students in grade 2 SD / MI. The video production results of the development of mathematical materials were tested on a limited basis to learners: as much as 100% of learners gave a positive response. Thus, it can be said that learners receive videos of mathematical material development and can be applied in learning, both online and offline learning. The video can affect learners' attention and make it easier for learners to learn long measurement materials. In line with what was revealed in the Raisa et al. study results, overall, learners gave an excellent response of 81%. According to media, learners positively create attraction, interest and help learners understand the material (Raisa et al., 2017). The statement is also in line with the results of Pasko et al.'s research that audiovisual methods in the video can increase children's knowledge by 60% after extension with audiovisual methods in the form of video (Prasko et al., 2016). In addition, the application of video in learning is considered more effective by 48.14% than not using video because using the senses of sight and hearing during learning can be beneficial for students in learning the material during the learning process. (Agustiniingsih, 2015). As explained by *Dale's cove of experience* and *Brunner's* theory, learning will be more meaningful if the teacher can create a learning environment that can activate students' five senses simultaneously during the learning process. Thus students will have no difficulty absorbing the studied material (Hadi, 2017).

CONCLUSION

Difficulty understanding the material is commonplace and is often faced by students from time to time. The reason is that mathematics material is still abstract and challenging for students to understand. This research seeks to produce video material development products through *Adobe After Effects*. The validity and feasibility of the product are determined from the assessment of experts, namely material experts in mathematics, learning media experts, and linguists. Overall of all experts members obtained a score with an excellent category. Mathematicians score a score of 5.0 categories very well; learning media experts score 4.7 categories very well; linguists 4.75 categories are excellent. The validation results conclude that the product of this research is said to be feasible to be tested and applied by students in the learning process. In addition to experts, teachers also assessed the video and got a perfect score of 5.0. Learners showed a positive response to the video, which was 100%. The student's response can be evidence video development of

mathematical materials can attract attention and provide new experiences for learners. Learners become excited and helped when studying long measurement materials. Researchers are aware of limitations in this study, and the development stage has not reached the dissemination stage (spread). In addition, the video has not been widely tested or tested for its effectiveness to learners. The hope is that the following study has reached the disseminated stage and tested the effectiveness of the video content of mathematical material that has been developed. Therefore, all teachers in Indonesia can make good use of it. This research has several things that need to be given a bottom line; First, teachers should always be creative and innovate to support the smooth learning process, constructing an effective learning atmosphere for learners. Second, schools can provide facilities to teachers by holding training or seminars on developing learning media to enrich the knowledge.

REFERENCES

- Agustiningsih, A. (2015). Video Sebagai Alternatif Media Pembelajaran dalam Rangka Mendukung Keberhasilan Penerapan Kurikulum 2013 di Sekolah Dasar. *PEDAGOGIA: Jurnal Pendidikan*, 4(1), 50–58. <https://doi.org/10.21070/pedagogia.v4i1.72>
- Awalia, I., Pamungkas, A. S., & Alamsyah, T. P. (2019). Pengembangan Media Pembelajaran Animasi Powtoon pada Mata Pelajaran Matematika di Kelas IV SD. *Kreano, Jurnal Matematika Kreatif-Inovatif*, 10(1), 49–56. <https://doi.org/10.15294/kreano.v10i1.18534>
- Azizah, M., Sulianto, J., & Cintang, N. (2018). Analisis Keterampilan Berpikir Kritis Siswa Sekolah Dasar pada Pembelajaran Matematika Kurikulum 2013. Vol. 35(No. 1). <https://doi.org/10.15294/jpp.v35i1.13529>
- Busyaeri, A., Udin, T., & Zaenudin, A. (2016). Pengaruh Penggunaan Video Pembelajaran terhadap Peningkatan Hasil Belajar Mapel IPA di MIN Kroya Cirebon. *Al Ibtida: Jurnal Pendidikan Guru MI*, 3(1), Article 1. <https://doi.org/10.24235/al.ibtida.snj.v3i1.584>
- Fadillah, A., & Bilda, W. (2019). Pengembangan Video Pembelajaran Berbantuan Aplikasi Sparkoll Videoscribe. *Jurnal Gantang*, 4(2). <https://ojs.umrah.ac.id/index.php/gantang/article/view/1369>
- Hadi, S. (2017). Efektivitas Penggunaan Video sebagai Media Pembelajaran untuk Siswa Sekolah Dasar. *Transformasi Pendidikan Abad 21 Untuk Mengembangkan Pendidikan Dasar Bermutu Dan Berkarakter*, 1, 96–102. <http://pasca.um.ac.id/conferences/index.php/sntepnpdas/index>
- Halimah, L. (2010). Musik Dalam Pembelajaran. *EduHumaniora | Jurnal Pendidikan Dasar Kampus Cibiru*, 2(2), Article 2. <https://doi.org/10.17509/eh.v2i2.2763>
- Hasil Analisis Kebutuhan. (2020).
- Hikmah, V. N., & Purnamasari, I. (2017). Pengembangan Video Animasi “Bang Dasi” Berbasis Aplikasi Camtasia pada Materi Bangun Datar Kelas V Sekolah Dasar. *Mimbar Sekolah Dasar*, 4(2), 182–191. <https://doi.org/10.23819/mimbar-sd.v4i2.6352>
- Husain, H. B., & Ariani, D. N. (2016). Pemanfaatan Video sebagai Media Pembelajaran Matematika SD/MI. *Muallimuna : Jurnal Madrasah Ibtidaiyah*, Vol. 2(No. 1).
- Istiqlal, M. (2017). Pengembangan Multimedia Interaktif dalam Pembelajaran Matematika. *Jurnal Ilmiah Pendidikan Matematika*, 2(1). <http://journal.upgris.ac.id/index.php/JIPMat/article/view/1480>
- Kurniawan, D. C., Kuswandi, D., & Husna, A. (2018). Pengembangan Media Video Pembelajaran pada Mata Pelajaran IPA tentang Sifat dan Perubahan Wujud Benda Kelas IV SDN Merjosari 5 Malang. *JINOTEP (Jurnal Inovasi Dan Teknologi*

- Pembelajaran): Kajian Dan Riset Dalam Teknologi Pembelajaran*, 4(2).
<http://journal2.um.ac.id/index.php/jinotep/article/view/4185>
- Kustandi, C., & Darmawan, D. (2020). *Pengembangan Media Pembelajaran: Konsep dan Aplikasi Pengembangan Media Pembelajaran bagi Pendidik di Sekolah dan Masyarakat*. Kencana Prenada Media Group.
- Lestari, W. (2017). Pengaruh Kemampuan Awal Matematika dan Motivasi Belajar terhadap Hasil Belajar Matematika. *Jurnal Analisa*, 3(1), 76–84.
<https://doi.org/10.15575/ja.v3i1.1499>
- Lukman, A., Hayati, D. K., & Hakim, N. (2019). Pengembangan Video Animasi Berbasis Kearifan Lokal pada Pembelajaran IPA Kelas V di Sekolah Dasar. *Elementary : Jurnal Ilmiah Pendidikan Dasar*, 5(2), 153–166.
<https://doi.org/10.32332/elementary.v5i2.1750>
- Maharani, D., & Hotami, M. (2017). Rendering Video Advertising dengan Adobe After Effects dan Photoshop. *Jurnal Manajemen Informatika Dan Teknik Komputer*, 2(2).
<https://doi.org/10.31227/osf.io/3nehj>
- Maloney, E. A., & Beilock, S. L. (2012). Math anxiety: Who has it, why it develops, and how to guard against it. *Trends in Cognitive Sciences*, 16(8), 404–406.
<https://doi.org/10.1016/j.tics.2012.06.008>
- Mashuri, S. (2019). *Media Pembelajaran Matematika*. Deepublish.
- Mujiani, D. S. (2016). Pengaruh Media Pembelajaran dan Kecerdasan Logis Matematis terhadap Hasil Belajar Matematika Siswa. *Jurnal Pendidikan Dasar*, Vol. 7(No. 2).
<https://doi.org/10.21009/JPD.072.02>
- Mulyatiningsih, E. (2013). *Model Penelitian Terapan Bidang Pendidikan*. Alfabeta.
- Novita, R., & Putra, M. (2016). Using Task Like Pica’s Problem to Support Student’s Creativity in Mathematics. *Journal on Mathematics Education*, 7(1), 31–42.
<https://doi.org/10.22342/jme.7.1.2815.31-42>
- Novitasari, D. (2016). Pengaruh Penggunaan Multimedia Interaktif terhadap Kemampuan Pemahaman Konsep Matematis Siswa. *FIBONACCI: Jurnal Pendidikan Matematika dan Matematika*, 2(2), 8–18. <https://doi.org/10.24853/fbc.2.2.8-18>
- Prasko, P., Santoso, B., & Sutomo, B. (2016). Penyuluhan Metode Audio Visual dan Demonstrasi terhadap Pengetahuan Menyikat Gigi pada Anak Sekolah Dasar. *Jurnal Kesehatan Gigi*, 3(2), 53–57. <https://doi.org/10.31983/jkg.v3i2.1784>
- Prastowo, A. (2015). *Panduan Kreatif Membuat Bahan Ajar Inovatif Menciptakan Metode Pembelajaran yang Menarik dan Menyenangkan* (Cet. Ke-8). DIVA Press.
- Raisa, S., Adlim, & Safitri, R. (2017). Respon Peserta Didik terhadap Pengembangan Media Audio-Visual. *Jurnal Pendidikan Sains Indonesia*, 5(2), 80–85.
<https://doi.org/10.24815/jpsi.v5i2.9821>
- Roffiq, A., Qiram, I., & Rubiono, G. (2017). Media Musik dan Lagu pada Proses Pembelajaran. *JPDI (Jurnal Pendidikan Dasar Indonesia)*, 2(2), 35–40.
<https://doi.org/10.26737/jpdi.v2i2.330>
- Rusman. (2018). *Belajar dan Pembelajaran Berbasis Komputer Mengembangkan Profesionalisme Guru Abad 21* (Cet. Ke-3). Alfabeta.
- Saputro, B. (2017). *Manajemen Penelitian Pengembangan (Research & Development) Bagi Penyusun Tesis dan Disertasi*. Aswaja Pressindo.
- Siswono, T. Y. E. (2018). *Pembelajaran Matematika Berbasis Pengajaran dan Pemecahan Masalah, Fokus pada Berpikir Kritis dan Berpikir Kreatif*. Remaja Rosdakarya.
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- Smaldino, S. E., Lowther, D. L., & Russel, J. D. (2014). *Instructional Technology & Media for Learning Teknologi Pembelajaran dan Media untuk Belajar Edisi Kesembilan Diterj. Oleh Arif Rahman (Ke-3)*. Kencana Prenada Media Group.
- Smith, J., & AGI Creative Team. (2012). *Adobe After Effects CS6 Digital Classroom*. John Wiley dan Sons, Inc.
- Sudjana, N. (2014). *Penilaian Hasil Proses Belajar Mengajar*. Remaja Rosdakarya.
- Susanto, A. (2019). *Teori Belajar dan Pembelajaran di Sekolah Dasar (Ke-2)*. Kencana Prenada Media Group.
- Syah, M. (2019). *Psikologi Pendidikan dengan Pendekatan Baru (Cet. Ke-23)*. Remaja Rosdakarya.
- Widiyoko, E. P. (2018). *Teknik Penyusunan Instrumen Penelitian (Cet. Ke-7)*. Pustaka Pelajar.
- Wisada, P. D., Sudarma, I. K., & S, A. I. W. I. Y. (2019). Pengembangan Media Video Pembelajaran Berorientasi Pendidikan Karakter. *Journal of Education Technology*, 3(3), 140–146. <https://doi.org/10.23887/jet.v3i3.21735>
- Yudianto, A. (2017). *Penerapan Video Sebagai Media Pembelajaran*. 234–237. <http://eprints.ummi.ac.id/354/>