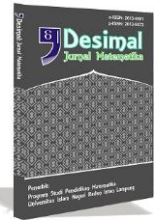




Contents lists available at DJM

DESIMAL: JURNAL MATEMATIKA

p-ISSN: 2613-9073 (print), e-ISSN: 2613-9081 (online), DOI 10.24042/djm
<http://ejournal.radenintan.ac.id/index.php/desimal/index>



The development of learning video media on sequence and series materials

Kamalia, Lusiana*, Destiniar

Universitas PGRI Palembang, Indonesia

ARTICLE INFO

Article History

Received : 01-10-2021

Revised : 10-01-2022

Accepted : 17-02-2022

Published : 30-03-2022

Keywords:

Development; Learning Video Media; Sequence and series.

*Correspondence: E-mail:

luu.sii.ana@gmail.com

Doi:

[10.24042/djm.v5i1.9973](https://doi.org/10.24042/djm.v5i1.9973)

ABSTRACT

This research aims to produce a video media product for learning the material of sequences and series for class XI students that is valid, practical, and has potential effects. The method used in this research is the research and development method with the ADDIE development procedure, which consists of five stages, namely: 1) Analysis, 2) Design, 3) Development, 4) Implementation, and 5) Evaluation. The instruments used to obtain research data are in the form of expert validation questionnaires, student response questionnaires, and test sheets. The results of the assessment from the experts obtained a percentage score of 84.81% so that the learning video was declared "Valid". The results of the student response questionnaire obtained a percentage score of 92.70% with the "Very Practical" category. Student test results after using the learning video obtained a percentage of learning completeness of 81.25% with the criteria "Very High" so that the learning video is declared to have a potential effect and is suitable for use in the learning process.

<http://ejournal.radenintan.ac.id/index.php/desimal/index>

INTRODUCTION

Education has an important role in improving the quality of human resources because education can help humans to develop in a better direction. This is in line with the goals of national education as stated in Undang-Undang Republik Indonesia Nomor 20 (2003) which states that basic education aims to lead students to better behavior changes starting from the intellectual, moral, and social aspects so that they can live independently as individuals or social beings and be able to compete in the future.

In educational activities, there are many types of knowledge given to students during the learning process, one of which is Mathematics. According to Ulya et al. (2019) mathematics is a branch of science that plays an important role in the development of science and technology. In addition, mathematics also plays an important role in life because in mathematics there are various forms of symbols, formulas, theorems, propositions, provisions, and concepts used in calculations, measurements, forecasting, and so on.

One of the learning materials in mathematics that is related to everyday life is sequences and series material. The concept of sequences and series materials is widely used in everyday life, including to determine the amount of growth, decay, compound interest, and annuities. However, in learning activities, there are still students who have difficulty understanding the concept of sequences and series, especially arithmetic sequences and series, based on the research of Oktopiani (2017), it was found that when students study arithmetic sequences and series, students still had difficulty in determining the problems given whether it is a matter of arithmetic sequences or arithmetic series or not both. In addition, students also have difficulty in determining what is known from story questions about arithmetic sequences and series or converting story problems into mathematical models so that students cannot determine the steps to solve the problem.

Currently, learning activities are carried out online due to the outbreak of the Corona Virus Disease (COVID-19). In online learning, teachers are required to be able to take advantage of increasingly developing technology as an innovation in learning and as an effort to overcome limitations in online learning.

During online learning, teachers experience difficulties in conveying learning materials, this happens because learning models and learning media cannot be fully implemented considering that online learning takes place in a limited manner. Even though the use of appropriate learning media can overcome

teacher difficulties in delivering learning materials (Maemunawati & Alif, 2020), the use of learning media can attract students' attention so that it can increase students' motivation and enthusiasm for learning (Nurrita, 2018).

One of the learning media that can be used by teachers when learning is carried out online is audio-visual motion media in the form of learning videos (Qurrotaini et al., 2020). With the use of learning video media, students can receive learning material visually and audio where the explanation of the material can be captured easily compared to just audio media or visual media. This statement is in line with the principle of Mayer (2001) which states that "people will learn better if using audio, pictures, animation, video, and text than with text-only, audio-only, video only, images only, or animation only".

Based on this background, the researchers are interested in conducting research on the development of learning video media for sequences and series material for class XI students with the expectation that it can help teachers in conveying the material and help students understand the material.

METHOD

This research uses Research and Development methods with ADDIE development procedures, which consist of five stages, namely Analysis, Design, Development, Implementation, and Evaluation. The illustrations of the design in this research are as follows.

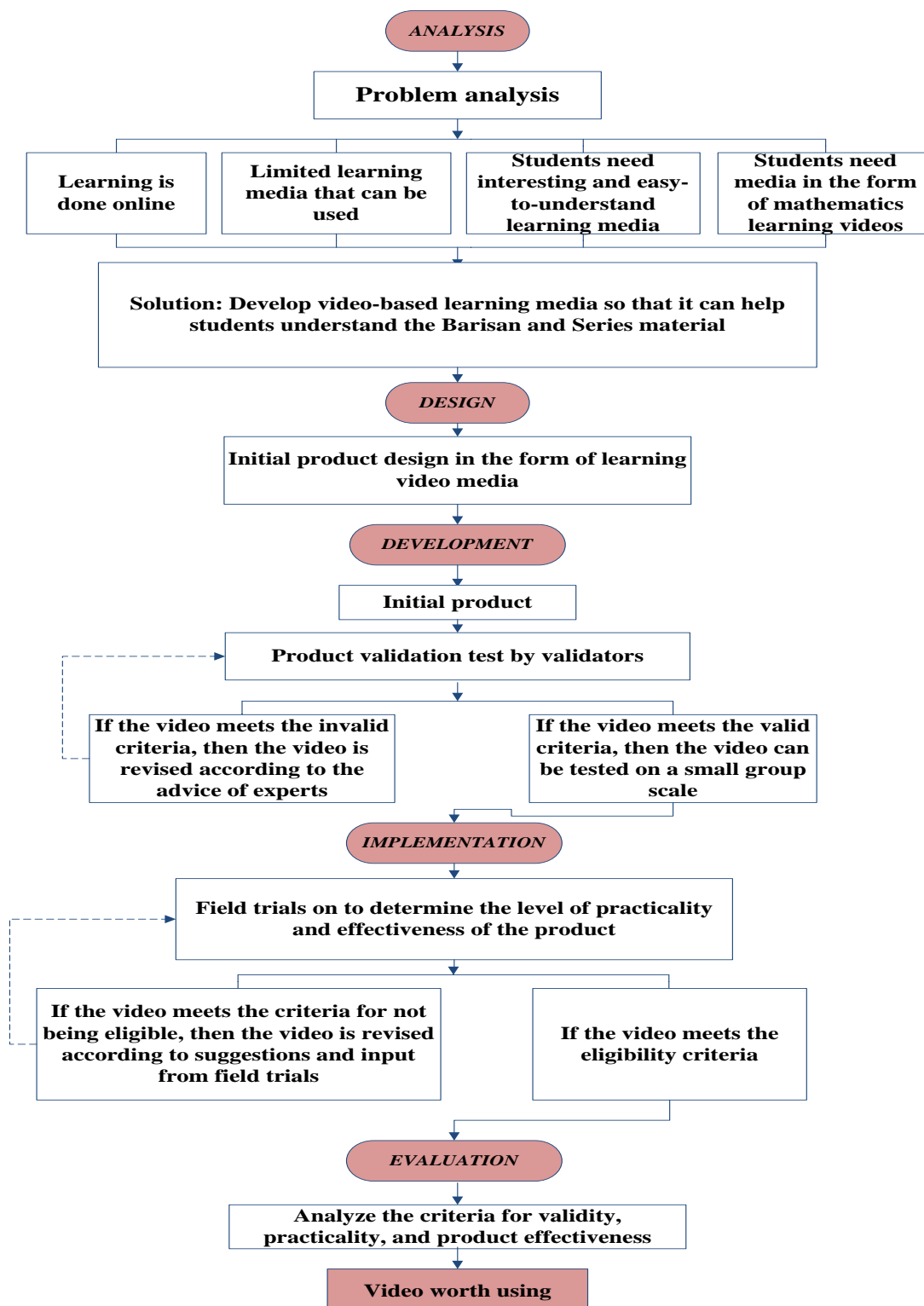


Figure 1. Frame of Mind Chart

The product developed was tested at SMA Negeri 11 Palembang. The trial process is carried out on the even semester of the 2020-2021 academic year on June 14-16, 2021, with a small group trial subject of 6 students of class XI IPA 6, 14 students of class XI IPS 7 for the field

trial, and the product validation is done by 2 lecturers and 1 mathematics teacher.

The development procedure used in this research is the ADDIE (Analysis, Design, Development, Implementation, and Evaluation) procedure. The stages of the ADDIE model in this research are

1. Analysis, in this research there are two aspects analyzed namely, the product needs analysis and curriculum analysis.
2. Design, at this stage the researcher makes a learning video design in the form of learning media materials, making illustrative images, and selecting music.
3. Development, at this stage the researchers began to develop learning videos. After developing, then validated to measure the level of validity.
4. Implementation, after the video is declared valid, it is then tested in small groups and tested in the field to determine the level of practicality and potential effects of using learning videos.
5. Evaluation, the data that is evaluated is in the form of practicality data and potential effects. The evaluation was carried out to determine the effect of using learning videos on students' final competencies.

The instruments used to collect data in this research were an expert validation questionnaire sheet to test the validity of the product, a student response questionnaire sheet to test the practicality of the product, and a student test sheet to determine the potential effects of using the product.

The data analysis technique used in this research is the descriptive analysis technique. The data analysis in this research was reviewed from the aspects of validity, practicality, and potential effects of learning videos.

1. Validity Analysis

Validity analysis was carried out on aspects of content, construct, and language. Product validity data were obtained from a validation questionnaire sheet in the form of a Likert scale of 1-5 (Sugiyono, 2017)

Product validity is determined based on the percentage score from the validation questionnaire sheet which is

classified using the table of validity assessment criteria (Hobri, 2010).

2. Practical Analysis

Aspects that are assessed on practicality are students' responses to the use, materials, and language in the learning video. The instrument used for practicality analysis is a student response questionnaire sheet in the form of a Likert scale of 1-5 (Sugiyono, 2017).

The level of practicality of the product is determined from the percentage score generated after a small-scale trial and is classified based on the practicality assessment criteria table (Hobri, 2010).

3. Potential Effect Analysis

Potential effect analysis data obtained from student test results after using learning videos. The product can be said to have a potential effect if the classical mastery of student learning outcomes after using the product reaches 80% (Tatag, 2019). Meanwhile, to find out the criteria for completeness of student learning outcomes after using learning videos, a table of academic assessment criteria was used (Widoyoko, 2009).

RESULTS AND DISCUSSION

The result of this research is a video product of learning materials for arithmetic sequences and series that have been tested for validity, practicality, and potential effects. Based on research conducted by Sudarsana et al. (2017) it was found that students did not understand well the sequence and series material so it had an impact on student learning outcomes. Meanwhile, from research of Sabilla et al. (2020), it was found that student learning outcomes before and after using instructional video media had increased. So that learning videos can be said to be able to help students understand the learning material. This is also reinforced by the statement of Awalia et al. (2019) that

learning media packaged in the video can provide long-term memory to students because it is presented through animation, images, and sound. Learning videos are considered as a way to trigger motivation, interest and build students' sense of competence in learning mathematics and science (Febriani, 2017).



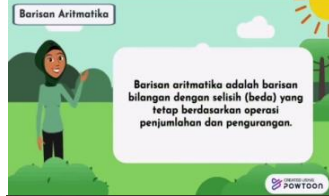

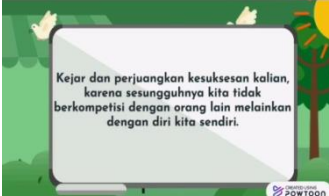
The learning video in this research has a duration of 16 minutes 12 seconds with the original file size of 228 MB. The main application in making this video uses the PowToon application. The PowToon application was chosen because the application provides many animations and has advanced features on one screen, so it can create various animations as needed (Awalia et al., 2019). In addition, there are also two supporting applications, namely Kine Master and Power Director. The learning video consists of several parts, namely the opening section, explanation of KD and learning objectives, content of the material along with sample questions, evaluation questions, motivational quotes, and closing sections.

The advantages of this learning video are the attractive appearance of learning videos because the learning videos are presented in animated form and are easy to understand so that they can increase students' enthusiasm for learning. This is in accordance with the statement of Hasbullah (2018), which states that the presentation of material in

the form of animation has many advantages such as arousing students' enthusiasm for learning, can eliminate student boredom in learning, and can attract students' attention to stay focused in the learning process. In addition, if the learning video is shared with students in the form of a YouTube link or a Google Drive link, the learning video can be used online, but if the student downloads the learning video so that it is stored in the memory of the cellphone/laptop, the student can use the learning video without having to connect to the internet (offline). While the drawback of using learning videos is that the learning videos can only be used if a cellphone/laptop is available. If it is not available, then the learning video cannot be used.

The development of this learning video begins with analyzing the needs of learning video products and curriculum, making video designs starting from finding information and references about journals and research on the development of learning videos that will be used as relevant sources to making a Storyboard which is an outline of the content of the learning video. After all the video components have been collected, the next step is the development of learning videos according to the Storyboard using the selected application and producing videos in mp4 format. Storyboard learning videos in this research can be seen in Table 1.

Table 1. Learning Video Design Storyboard

| Description | Video Visualization | Video Narrative |
|----------------------|---|--|
| Opening |  | At the beginning of the video there is an intro and video title “Barisan dan Deret Aritmatika” |
| |  | Definition of Arithmetic Sequences and Series |
| Content of Materials |   | Discussion about Arithmetic Sequences and Series |
| Closing |  | Motivational quotes to close the video |

After the development process, further validation of the learning video by the validators. At the validation stage, the validators were given a prototype I learning video. Then the validators

assessed prototype I based on aspects of content, construct, and language. The following are suggestions and comments given by validators to prototype I.

Table 2. Comments and Suggestions from Validation I

| Validator | Comments and Suggestions |
|-------------|--|
| Validator 1 | 1. In the explanation of an arithmetic sequence, a term is given, which one is called the first term? |
| | 2. Likewise for the difference (b) and others. |
| Validator 2 | 1. The second slide becomes the first slide |
| | 2. Add questions after each sample question. |
| Validator 3 | 1. Differentiate the background color of the video with the color of the clothes of the person explaining the material |
| | 2. The sentences in the definition explanation section are not clear. |

Furthermore, the learning video was revised based on the suggestions and comments of the validators. The following is the revised result of the learning video.

1. Add arrows to the term referred to as the first term, the difference (b), and others.

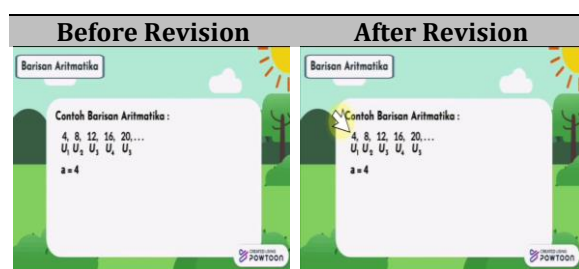


Figure 2. Revision of Adding Arrow Description

2. The second slide of the video is used as the first slide.



Figure 3. Revision of the Opening Section of the Learning Video

3. Add a question after each sample question for student testing.



Figure 4. Revision of Adding Questions after Sample Questions

4. The background color of the video is almost the same as the color of the clothes of the person explaining the material, it's better to differentiate.

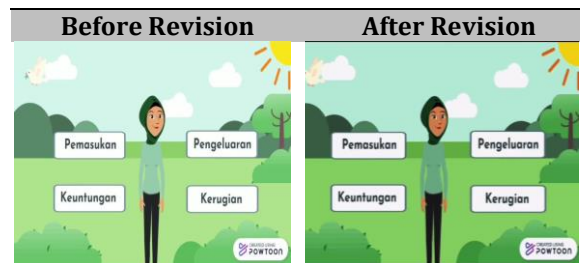


Figure 5. Revision of Learning Video Background Color with Shirt Color

5. The explanation of the material is not clear, it should be bolded to make it clear.

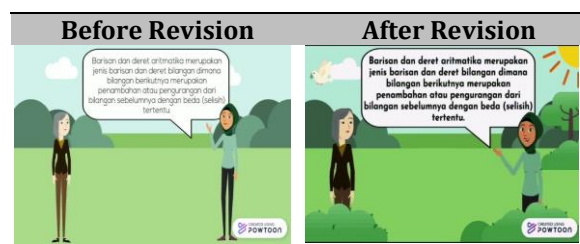

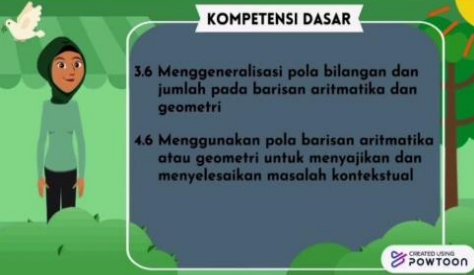
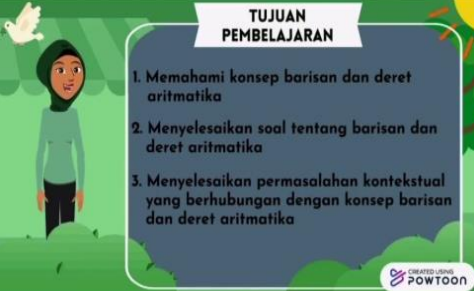
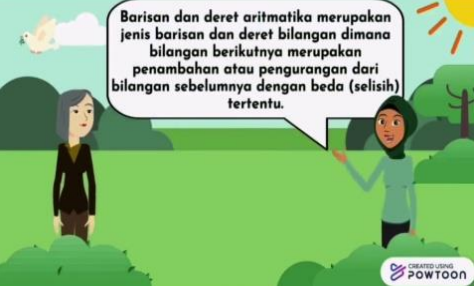
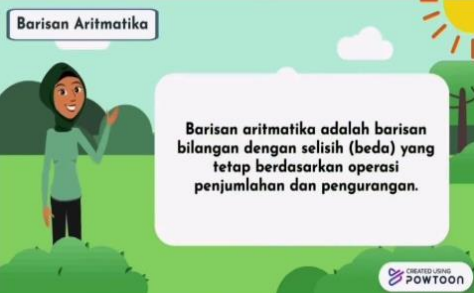
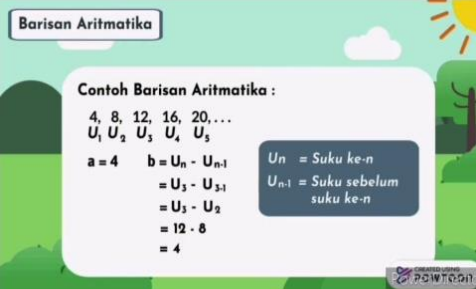

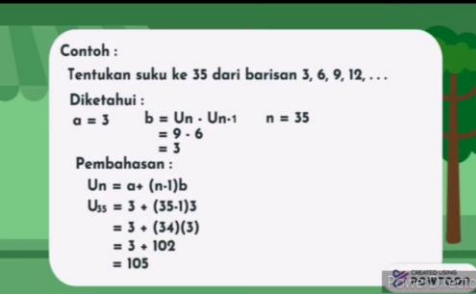


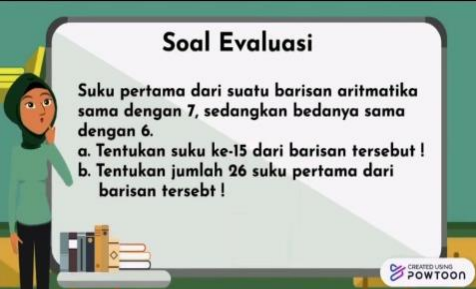


Figure 6. Revision of Sentences in the Definition Explanation Section to be Clearer

After the learning video was revised based on suggestions and comments from the validators, then the learning video was validated again. The revised learning video is referred to as prototype II. The following is a prototype II display from the learning video.

Table 3. Display of Prototype II Learning Video

| Description | Video Display | Time |
|---|--|----------------|
| Opening |  | ±30 Seconds |
| Explanation of Basic Competencies |  | ±25 Seconds |
| Explanation of Learning Objectives |  | ±25 Seconds |
| Definition of Arithmetic Sequences and Series |  | ±50 Seconds |
| Definition of Arithmetic Sequences |  | ±40 Seconds |

| | | |
|--|--|--------------------|
| <p>Arithmetic Sequence Example</p> |  | <p>±1 Minute</p> |
| <p>Definition of Arithmetic Series</p> |  | <p>±50 Seconds</p> |
| <p>Arithmetic Sequence Example</p> |  | <p>±1 Minute</p> |
| <p>Arithmetic Sequence Contextual Problems</p> |  | <p>±2 Minutes</p> |
| <p>Arithmetic Series Contextual Problems</p> |  | <p>±3 Minutes</p> |
| <p>Evaluation Questions</p> |  | <p>±15 Seconds</p> |

| | | |
|---------------------|--|----------------|
| Motivational Quotes |  | ±20 Seconds |
| Closing |  | ±5 Seconds |

In the second validation, the learning video got good suggestions and comments without revision, so it was worth testing it out. The comments and suggestions from the validators regarding prototype II are in Table 4.

Table 4. Comments and Suggestions from Validation II

| Validator | Comments and Suggestions |
|-------------|--|
| Validator 1 | Learning videos are worth a try |
| Validator 2 | Learning videos are accepted so they can be tested |
| Validator 3 | Product trial can be continued |

In addition to getting comments and suggestions, in this validation stage, the learning video product also gets an assessment through a validation questionnaire sheet. The following are the results of the validators' assessment of the learning video through a validation questionnaire sheet.

Table 5. Expert Validation Results

| Validator | Score |
|----------------|------------|
| Validator 1 | 83 |
| Validator 2 | 74 |
| Validator 3 | 72 |
| Average | 229 |

After obtaining the average score, then determining the percentage score of

the entire validation questionnaire using the following Validity Value equation.

$$\begin{aligned}
 NV &= \frac{\text{Total score obtained}}{\text{Maximum score}} \times 100\% \\
 &= \frac{229}{270} \times 100\% \\
 &= 84.81\%
 \end{aligned}$$

Based on this equation, the percentage score of 84.81% is obtained, so that the learning video is included in the "Very Valid" criteria and deserves to be tested. This is in accordance with the validity criteria according to Hobri (2010), if the product has a validity value (NV) of more than 80%, the product is declared very valid without revision.

In addition, the learning video product was declared worthy to be tested because from the aspect of content, construct, and language it received a good assessment, seen from the assessment of the validators through a validation questionnaire. This is reinforced by the statement of Cahyani (2014), which states that a product can be said to be valid if the material components in the product are connected consistently with validity content and based on science. After the learning video product is revised and

validated, it produces a prototype II that is worthy of being tested.

Learning video products that have been declared valid are then tested through two stages, namely small group trials and field trials. Small group trials were conducted by distance learning (online) and tested on students of class XI IPA 6 at SMA Negeri 11 Palembang with a total of 6 students. The small group trial assessment was carried out by preparing student response questionnaires for students. The following are the results of student assessments after using learning videos.

Table 6. Student Response Questionnaire Results

| Student | Score |
|--------------------|------------|
| AF | 79 |
| ASP | 77 |
| MAI | 63 |
| MBF | 75 |
| MIK | 76 |
| VD | 75 |
| Total Score | 445 |

From the table above, the total score of the student response questionnaire is 445. Next, calculate the average value of each student using the following Practicality Value Equation.

$$\begin{aligned} NP &= \frac{\text{Total score obtained}}{\text{Maximum score}} \times 100\% \\ &= \frac{445}{480} \times 100\% \\ &= 92.70\% \end{aligned}$$

From this equation, the learning video product obtained a percentage score of 92.70% so it was declared "Very Practical" and received good comments from students who stated that the learning video product in this research was interesting and easy to understand so that the product could be tested in the field without revision. This is in line with the

statement of Haviz (2016), which states that the level of practicality of a product can be seen from the explanation of product users that the product can be used and can be understood by users. Based on comments and suggestions from students, the researchers can conclude that using interesting and easy-to-understand learning videos, can increase students' enthusiasm for learning and can help students understand the material.

After going through a small group trial, then the learning video product was tested in the field (field test). This trial was carried out for two days and was carried out by distance learning (Online) through the WhatsApp and Zoom applications. This trial was conducted on students of class XI IPS 7 at SMA Negeri 11 Palembang with a total of 16 students, at the end of the lesson the students were given 5 test questions to do. After the trial was carried out and given a learning test sheet, 13 of 16 students got a score of 72, and 3 other students got a score < 72. Based on the results of the student tests, some students who are complete or incomplete have difficulty understanding the story questions, so they cannot write what was known, asked, and did not make conclusions at the end of the answer. However, students can determine the formula to be used. Based on the results of student tests, the percentage of completeness of student learning outcomes as a whole is 81.25% with the criteria "Very High", it can be stated that the learning video has a potential effect. This is in line with the statement of Tatag (2019) which states that if the percentage of classical student learning test results completeness reaches a minimum of 80%, then the product can be said to have a potential effect (effective).

Thus, the video for learning sequences and series is declared feasible to be used in mathematics learning activities and has a potential effect on students so that the learning video can be

used by both teachers and students to understand the material for sequences and series materials.

CONCLUSIONS AND SUGGESTIONS

Based on the results of data analysis, the learning video media for sequences and series material for class XI students was declared "Very Valid" because from the validation results the validators obtained a percentage score of 84.81%. In terms of practicality, it obtained a percentage score of 92.70% which was classified as "Very Practical", and was declared to have a potential effect with the "Very High" criteria because the percentage of students' completeness after using learning videos reached 81.25%, so the learning videos can be used in the learning process.

Further research can use various other video applications to make learning videos for other learning materials. In addition, further research can pilot learning videos in a wider scope, so that they will produce learning videos that are more valid, practical, and can be used more widely.

REFERENCES

- Awalia, I., Pamungkas, A. S., & Alamsyah, T. P. (2019). Pengembangan media pembelajaran animasi powtoon pada mata pembelajaran matematika di kelas IV SD. *Kreano, Jurnal Matematika Kreatif-Inovatif*, 10(1). <https://doi.org/10.15294/kreano.v10i1.18534>
- Cahyani, U. A. E. (2014). *Pengembangan perangkat pembelajaran matematika dengan pendekatan penemuan terbimbing (guided discovery) materi prisma dan limas untuk siswa smp kelas viii semester II*. Universitas Negeri Yogyakarta.
- Febriani, C. (2017). Pengaruh media video terhadap motivasi belajar dan hasil belajar kognitif pembelajaran ipa kelas V sekolah dasar. *Jurnal Prima Edukasia*, 5(1).
- Hasbullah, H. (2018). Peningkatan hasil belajar kognitif biologi menggunakan model problem base learning berbasis powtoon siswa kelas xii ipa 7 sma n 1 metro semester ganjil tahun pelajaran 2017/2018. *BIOEDUKASI (Jurnal Pendidikan Biologi)*, 9(2). <https://doi.org/10.24127/bioedukas.i.v9i2.1623>
- Haviz, M. (2016). Research and development; penelitian di bidang kependidikan yang inovatif, produktif, dan bermakna. *Ta'dib*, 16(1). <https://doi.org/10.31958/jt.v16i1.235>
- Hobri, H. (2010). Metodologi penelitian pengembangan (aplikasi pada penelitian pendidikan matematika). *JEMBER: Pena Salsabila*.
- Maemunawati, S., & Alif, M. (2020). Peran guru, orang tua, metode dan media pembelajaran: strategi kbm di masa pandemi covid-19. In *Laboratorium Penelitian dan Pengembangan FARMAKA TROPIS Fakultas Farmasi Universitas Muallawarman, Samarinda, Kalimantan Timur* (Issue April).
- Mayer, R. E. (2001). *Multimedia learning*. Cambridge University Press.
- Nurrita, T. (2018). Pengembangan media pembelajaran untuk meningkatkan hasil belajar siswa. *MISYKAT: Jurnal Ilmu-Ilmu Al-Quran, Hadist, Syari'ah Dan Tarbiyah*, 3(1), 171.
- Oktopiani, R. (2017). *Desain didaktis materi barisan dan deret aritmetika untuk mengembangkan penalaran matematis siswa smp kelas ix*. Universitas Pendidikan Indonesia.
- Qurrotaini, L., Sari, T. W., Sundi, V. H., & Nurmalia, L. (2020). Efektifitas penggunaan media video berbasis powtoon dalam pembelajaran daring. *Prosiding Seminar Nasional Penelitian LPPM UMJ*.
- Sabilla, A. F., Irianto, S., & Badarudin. (2020). Pengembangan media

- pembelajaran matematika materi keliling dan luas bangun datar menggunakan animasi powtoon di kelas iv sd universitas muhammadiyah. *Jurnal Ilmiah Wahana Pendidikan*, 6(3).
- Sudarsana, I. M., Murdiana, I. N., & Lefrida, R. (2017). Penerapan model pembelajaran kooperatif tipe student teams achievement division (stad) untuk meningkatkan hasil belajar siswa kelas x ipa f sma negeri 1 parigi pada materi barisan dan deret. *Jurnal Elektronik Pendidikan Matematika Tadulako*, 5(1).
- Sugiyono. (2017). *Metode penelitian pendidikan pendekatan kuantitatif, kualitatif, dan R&D*. Alfabeta.
- Tatag, Y. E. S. (2019). *Paradigma penelitian pendidikan pengembangan teori dan aplikasi pendidikan matematika* (1st ed.). Remaja Rosdakarya.
- Ulya, M. R., Isnarto, Rochmad, & Wardono. (2019). Efektivitas pembelajaran flipped classroom dengan pendekatan matematika realistik indonesia terhadap kemampuan representasi ditinjau dari self-efficacy. *Jurnal PRISMA*, 2.
- Undang-Undang Republik Indonesia Nomor 20. (2003). *Sistem pendidikan nasional*.
- Widoyoko, E. P. (2009). Evaluasi program pembelajaran. *Yogyakarta: Pustaka Pelajar*.

