**International Journal of Elementary Education**
Volume 6, Number 1, Tahun 2021, pp. 29-37
P-ISSN: 2579-7158 E-ISSN: 2549-6050
Open Access: https://dx.doi.org/10.23887/ijee.v6i1

# Powtoon-Based Animated Videos as Learning Media for Science Content for Grade IV Elementary School

**Ni Kadek Rika Barbara[1*], Gede Wira Bayu[2]**

[1,2] Elementary School Teacher Education Study Program, Ganesha University of Education, Singaraja, Indonesia

**ARTICLE INFO**

**Article history:**
Received September 28, 2021
Accepted January 12, 2022
Available online February 25, 2022

***Kata Kunci:***
*Video, Powtoon, IPA*

**Keywords:**
*Video, Powtoon, Science*



***ABSTRAK***

*Kurangnya ketersediaan media pembelajaran inovatif yang mampu membantu menjabarkan materi secara efektif berdampak pada rendahnya motivasi belajar serta pemahaman siswa terhadap materi. Dibutuhkan media pembelajaran inovatif yang dapat meningkatkan mutu pembelajaran dan mewujudkan proses belajar yang lebih bermakna bagi siswa. Tujuan dari penelitian ini adalah untuk menciptakan media yang teruji validitasnya dan unutuk mengkategorikan respon guru dan siswa terhadap media pembelajaran video animasi berbasis powtoon. Penelitian ini merupakan penelitian pengembangan. Model pengembangan yang digunakan yaitu model ADDIE. Metode pengumpulan data yang digunakan adalah metode angket/kuisioner untuk mengumpulkan data hasil review dari ahli uji, uji coba guru dan siswa. Subjek dari penilitian ini yaitu 2 orang ahli materi, 2 orang ahli media, dan 2 orang praktisi. Objek dari penelitian ini yaitu validitas media video animasi berbasis powtoon. Teknik analisis data yang digunakan pada penelitian ini yaitu analisis deskriptif kualitatif dan analisis deskriptif kuantitatif. Hasil penelitian menunjukkan kualitas media berada pada ktegori sangat valid dengan perolehan skor 4,68, hal ini menadandakan bahwa media yang dikembangkan layak digunakan dengan kategori baik, sehingga layak dijadikan referensi mengatasi permasalahan kurangnya media inovatif. Media yang dikembangkan layak digunakan dengan kategori baik. Sehingga media pembelajaran video animasi berbasis powtoon pada topik siklus hidup hewan di kelas IV layak dijadikan referensi dalam mengatasi permasalahan kurangnya media inovatif. Implikasi dalam penelitian ini yaitu adanya media pembelajaran video animasi berbasis powtoon pada topik siklus hidup hewan di kelas IV Sekolah Dasar dengan kualitas "sangat valid", serta dapat dimanfaatkan dalam proses pembelajaran pada muatan IPA.*

**ABSTRACT**

The lack of availability of innovative learning media that is able to help describe the material effectively has an impact on the low motivation to learn and students' understanding of the material. Innovative learning media are needed that can improve the quality of learning and create a more meaningful learning process for students. The purpose of this research is to design a media development process, to develop media that has been tested for validity, and to find out the responses of teachers and students to the animation video based on Powtoon learning media. This research is development research. The development model used is the ADDIE model. The data collection method used is a questionnaire/questionnaire method to collect data from the results of reviews from test experts, teacher trials, and students. The subjects of this research are 2 material experts, 2 media experts, and 2 practitioners. The object of this research is the validity of the animation video based on Powtoon. The data analysis technique used in this research is the descriptive qualitative analysis and descriptive quantitative analysis. The results showed that the quality of the media was in the very valid category with a score of 4.68, this indicates that the developed media is suitable for use in the good category, so it is worthy of being used as a reference to overcome the problem of lack of innovative media. The developed media deserves to be used in a good category. So that the animation video learning media based on Powtoon on the topic of animal life cycles in class IV deserves to be used as a reference in overcoming the problem of lack of innovative media. The implication of this research is the existence of an animation video based on Powtoon on the topic of animal life cycles in grade IV Elementary School with "very valid" quality and can be used in the learning process on science content.

## 1. INTRODUCTION

Media is an intermediary tool used to communicate. Media is also something that is used to stimulate thoughts, abilities, and skills that can encourage the learning process (Irmansyah et al., 2020; Sulfemi & Mayasari, 2019). Media are teaching aids that can be used to communicate in the ongoing learning process (Paranna & Airlanda, 2020; Setiyani et al., 2020). In learning activities, the media serves to aim at instruction where the information contained in the media must involve students in the form of real activities so that the learning process can occur (Herayanti et al., 2017; MS et al., 2017). In addition, learning media

*Corresponding author.
E-mail addresses: barbararika775@gmail.com (Ni Kadek Rika Barbara)

includes all the resources needed to communicate with learners (Angraini, 2017 : Pramita et al., 2019). Learning media are everything that can be used to channel messages (learning materials) so that they can stimulate the attention, interests, thoughts, and feelings of students (students) in learning activities to achieve certain learning goals (Herayanti et al., 2017 : Sundari, 2019). From the statement above, it is concluded that the media is a means to convey information to the recipients of the information. While learning media are tools and materials used to channel messages so that they can attract students' attention during the learning process. The existence of innovative learning media will increase student motivation in following the learning process. Media can be said to be innovative when the use of media is able to involve many of the students' senses (Wati & Widiansyah, 2020; Wulandari et al., 2020). In addition, good learning media to support the learning process must adapt to the applicable curriculum materials, make or choose media by considering prices that are not too expensive, and have ease of use (Adi & Widodo, 2018; Atmojo et al., 2020). Thus, the teacher as an educator is expected to be able to provide learning media in every lesson, so that the learning process carried out can provide meaning for students, considering that the media has a very vital function in learning.

But in reality, the learning carried out in schools still applies teacher-centered learning and is still based on teacher and student books and has not used learning media and the lack of learning models in the learning process (Mustaqim, 2017; Rahayu et al., 2020). In the learning process, the teacher also has not used learning media and learning methods so that students cannot see real examples of the material described (Arshad et al., 2021; Herliandry et al., 2020). Teachers only still use the lecture method and there is no interaction between students to teachers and students to students. There are still some students who are sleepy and lack focus on the ongoing learning process due to the lack of student creativity in the learning process (Jampel et al., 2018; Laksono et al., 2020). Especially the science content is still not equipped with new innovations that can make students improve their ability to think scientifically. Science is learning that contains components of scientific products, methods, and scientific attitudes (Narut & Supradi, 2019; Septyarini et al., 2021). Based on the results of interviews and observations made to class IV teachers of Cluster IV Bangli District for the 2020/2021 academic year, it was found that students' science knowledge competence was still low. This is supported by the results of distributing questionnaires for 2 days, namely December 3 and 4, 2020 which were given directly to fourth-grade elementary school teachers in Cluster IV, Bangli District, that 66.7% of teachers stated that the scope of available science textbooks was limited. 83% of teachers did not use media. learning when teaching science, 16.7% of teachers stated that the appearance of science teaching material books was less attractive, 50% of teachers stated that they did not make learning media when teaching, 66.7% of teachers stated that the learning media available in schools was limited. If this continues, students' interest in learning about learning materials, especially in science learning content will decrease and will affect student learning outcomes in the learning process.

Seeing the discrepancy between ideal conditions and conditions in the field, a solution or solution to the problem is needed. One solution that can be done to overcome these problems is to develop an innovative and interesting learning media that is in accordance with the current state of learning, namely developing innovative and creative learning media that can stimulate students' interest in learning. This is supported by the results of a questionnaire that was shown to the homeroom teacher of class IV SD in Cluster IV Bangli District where 100% of teachers stated that science material needed to be developed or packaged into animated video based on Powtoon, 100% of teachers also stated that the use of learning media made students more comfortable. passion for learning. One of the media that can be used by teachers to assist the teaching and learning process is learning video media. The learning videos used by the teacher must be adjusted to the abilities and characteristics so that the learning videos can help students understand the learning material. One of the audio-visual media that can attract students' interest in learning is that which is developed into a learning video using the powtoon application. This is supported by several relevant research results including research that says the powtoon application presents learning in the form of audio-visual which will make learning more interesting for students and learning will be more fun because students no longer study with books that look less attractive through many features. -the features it has, such as animations, transition effects that are more lively and more interesting to use (Arif & Muthoharoh, 2021).

With the features in the media, students will be more enthusiastic in learning activities because students are more interested in learning media in which there are animated images, transitions, and even not only observing but also listening to the sounds contained in the media (Muskania et al., 2019). Using learning video media using the Powtoon application can optimize learning activities (Febriana & Wahyuningsih, 2019; Novita et al., 2019). Audio-visual learning media powtoon about self-concept in group guidance for students in elementary schools can effectively be used for classroom learning methods (Fitriyani, 2019; Kartowagiran et al., 2019). Interactive video learning media in science subjects for ecosystem component materials can improve students' understanding of the material. The research stated

that through the process of making powtoon media, students' creative thinking skills from five aspects, namely fluency, flexibility, originality, elaboration, and evaluation. Based on the results of the analysis in the form of questionnaires and observation sheets, it was obtained that students were able to grow creative thinking skills (Laksono et al., 2020; Manurung, 2020). The learning outcomes of fifth-grade students in science learning using powtoon media are effectively used in improving student learning outcomes in science learning on earth's structure material (Maulana & Suwandi, 2019; Sutiarso et al., 2017). The PowToon learning media developed is practical and has a potential effect in increasing understanding of lecture material (Nurdiansyah et al., 2018; Sangsawang, 2020). Powtoon-based learning media is interesting and motivates students to learn (Hashim et al., 2020; Sukmanasa et al., 2020). Students really understand the material and are very interested in learning science so that it is effectively used in the learning process with animation video based on powtoon (Mayub et al., 2020; Wulandari et al., 2020). However, from some of the media developed, there are several things that are considered not optimal, ranging from the absence of voice dubbing to unattractive image animations (Hamidah et al., 2020; Mayub et al., 2020).

Therefore, it is necessary to do further development to optimize the aspects that are deemed not optimal based on previous research. In this development, the powtoon-based learning video media is enhanced by adding voice dubbing so that the material delivered is clearer and the understanding of the material obtained by students is the same as each other. The use of animation in video learning media based on the Powtoon application on the media developed this time will be more diverse so that students are more interested in participating in the learning process. The material that will be used in the development of learning video media based on the Powtoon application is material for the fourth-grade students of the animal life cycle. The purpose of this research is to design the validity of the Powtoon application-based learning video media that can be developed on the life cycle material of class IV animals. The product developed in this development will produce learning video media based on the Powtoon application which is different from the previous development because it is equipped with audio dubbing in presenting the material in order to provide a perception between one student and another. In addition, the use of animation in the media developed this time will be more interesting than the media developed previously so that students become more interested in participating in the learning process.

## 2. METHOD

The type of research used in this research is research and development-oriented to a product. The product developed is Powtoon-Based Animated Video Learning Media on Science Content for Class VI Animal Life Cycle Materials. The development research model used is the ADDIE development model (Analyze, Design, Development, Implementation, Evaluation). This model is used because this model has a systematic structure (Bakhri, 2019; Sutiarso et al., 2017). However, in this study the implementation and evaluation stages were not carried out due to the Covid-19 pandemic conditions. This research was conducted in an elementary school in Cluster IV, Bangli District. The data collection method used is a questionnaire/questionnaire method to collect data from the results of reviews from test experts, teacher trials and students. The subjects of this study consisted of 2 media experts, 2 learning material experts, and 2 practitioner experts. The data analysis technique used in this research is descriptive qualitative analysis and descriptive quantitative analysis. The data generated through qualitative descriptive analysis is in the form of descriptive data or words, and the data generated through quantitative descriptive analysis is the level of validity of the media itself. The data collection technique used in this development research was a questionnaire, namely material expert questionnaire, media expert questionnaire, practitioner questionnaire, and students response questionnaire. Data analysis in this study used quantitative descriptive data analysis techniques, which consisted of mean analysis to find product validity. The validity criteria are determined based on the average validity score of the expert assessment results, then adjusted according to the assessment criteria. Then the scores that have been obtained are calculated on average to determine the validity of the learning video media using the mean formula. The product validity criteria can be seen in Table 1.

**Table 1.** Powtoon-based Animation Video Media Validation Assessment Criteria

| Category | Score Interval |
|---|---|
| Very Valid | 4,21 ≤ Va < 5,00 |
| Valid | 3,41 ≤ Va < 4,20 |
| Enough | 2,61 ≤ Va < 3,40 |
| Not enough | 1,81 ≤ Va < 2,60 |
| Bad | 1,0 ≤ Va < 1,80 |

## 3. RESULT AND DISCUSSION

### Result

This research uses the ADDIE research model which consists of 5 stages, but the implementation and evaluation stages were not carried out because the world situation was in the COVID-19 pandemic. The analyze stage consists of 4 stages, namely needs analysis, the results of the needs analysis of learning video media include the availability of material in student textbooks, types of learning media that are often used in the learning process, the availability of learning media in schools, the percentage of needs for developing innovative learning media, curriculum analysis, the results of curriculum analysis obtained Basic Competence (KD) and learning achievement indicators used as a reference for discussion of material in the developed teaching materials, analysis of student characteristics, the results of this analysis will be the basis for knowing the characteristics of students so that later the development design will be carried out according to with the characteristics of students, media analysis, the results of this analysis are aspects that will be used in developing learning video media, including material aspects, language aspects, presentation aspects, format aspects, visual aspects, sound aspects, effective aspects, and practical aspects. KD and indicators that have been successfully analyzed can be seen in Table 2.

**Table 2.** Analyze Results of Basic Competencies and Indicators

| No. | Basic competencies (KD) | Indicators |
|---|---|---|
| 1. | Comparing the life cycles of several types of living things and linking them with conservation efforts. | 1.2.1. Explain the life cycle of several types of animals.<br>1.2.2. Comparing the life cycles of several types of animals. |

The second stage is the design stage, at this stage, it has been able to produce a prototype design from the Powtoon application-based learning video media. The design stage begins with data collection (materials) is carried out by summarizing the material contained in the science content of the topic of the animal life cycle for grade IV Elementary School, then collecting the background and pictures related to the material. Next, create a scenario from a powtoon-based animated video in the Storyboard application. The last stage at the design stage is finishing, the activity at the finishing stage is to determine the template/background used to match the writing that will be used in the discussion of the material. This stage focuses on producing designs or concepts in media development, the next media creation is carried out at the development stage. The successfully developed design can be seen in Figure 1.


**Figure 1.** Media Preliminary Design

The last stage is the development stage, at this stage the materials and images that have been designed are then developed, arranged, and combined into one according to a predetermined design so that they become teaching materials for Powtoon-based animated video learning media that are ready to be used in the learning process. In the process, there are several suggestions submitted by experts, including: (1) the second indicator please adjust it so that it is equal to or higher than the Basic Competence, the learning objectives are adjusted, the dragonfly image can be replaced with a more real/real image, references can be added, the text and background are contrasted more so that the text is clearer before the question add a summary of the material, the name of the supervisor is included at the beginning of the video, (2) the numbering writing is neat from the beginning to the end of the video, the learning objectives use the

ABCD format, the language during the life cycle with metamorphosis there are two parts instead of several parts replace in the audio, the opening title is revised, the text must be consistent in size, type and left-aligned, the background is different from evaluation and material, PNG images and adapted to the presenter, the speed of the text with the narration. The images of learning video media that have been successfully developed can be seen in Figure 2.


**Figure 2.** Learning Video Media

Based on the predicate obtained, the developed media has been tested for validity and is suitable to be used as learning media. Research on the development of animation video learning media based on Powtoon on the topic of animal life cycles is suitable for use for fourth-grade elementary school students because elementary school students are in the concrete operational stage. The concrete operational stage of children can be grouped into concrete thinking, meaning that they can understand if they are assisted by media images or other concrete objects (Bujuri, 2018). The data from the media validity test were then analyzed to determine the validity of the developed media. Data analysis was carried out by calculating the average score obtained from the assessment sheet by experts, practitioners, and students. The data is then converted to determine the category of media assessment developed. The results of the media assessment are listed in Table 3.

**Table 3.** Assessment Category of each Respondent

| No. | Respondent | Score | Rating Category |
|---|---|---|---|
| 1. | Material Expert | 4, 7 | Very Valid |
| 2. | Media Expert | 4, 7 | Very Valid |
| 3. | Practitioner Response | 4, 78 | Very Valid |
| 4. | Student Response | 4, 53 | Very Valid |
| | **Overall Result** | **4, 68** | **Very Valid** |

Based on the validity test, the validity results obtained from material experts, media experts, practitioner responses, and student responses get an overall result of 4.68. Based on table 4.6 the average results of the overall media developed have a Very Valid assessment category. This condition identifies that the animation video learning media based on the topic of animal life cycles is very valid.

**Discussion**

Powtoon-based animated video learning media that was developed aims to facilitate students and teachers in the learning process so that the material learned can be easier to understand. Powtoon-based animated video media on the topic of animal life cycles developed based on the ADDIE model. This model was chosen because it has clear and systematic stages of learning development. The stages of the ADDIE model are the analyze stage, the design stage, the development stage, the implementation stage, the evaluation stage, but the implementation stage and the evaluation stage were not carried out due to time, financial, and resource limitations. The first stage in this study, namely the analyze stage, was carried out by analyzing needs, curriculum analysis, analyzing student characteristics, and analyzing good media (Hartini et al., 2018; Mulyanti et al., 2020). Based on the results of the analysis, the animation video learning media based on Powtoon needs to be developed and is suitable to be developed on the topic of the life cycle of fourth-grade elementary school animals. After carrying out the analyze stage, the next stage is the design stage. This stage has the aim of designing the media that will be made according to the results of the analysis that has been done previously (Laksono et al., 2020; Setiyani et al., 2020). At the design stage, the thing that must be done is to make a design (storyboard) and design a learning video component using the Powtoon Application. The development stage is carried out with media development. The media is developed

according to the design that has been made (Mithen et al., 2021). After the media has been developed, it is then assessed by 4 lecturers, 2 teachers, and 18 students by providing a media assessment sheet.

This development research resulted in a product in the form of animation video learning media based on Powtoon on the topic of animal life cycles for grade IV SD. The design for making videos is making a design (storyboard) and designing learning video components using the Powtoon Application (Marlina et al., 2017; Rusydiyah et al., 2021). After designing the storyboard, proceed with making a video using the powtoon application. In the early stages of the video, there is the title of the learning media, the Undiksha logo and student identity, the name of the supervising lecturer, delivering learning materials. Followed by conveying basic competencies, indicators of material achievement, and learning objectives. In the material part of the animal life cycle, the understanding of the animal life cycle and the parts of the animal life cycle is shown. In the metamorphosis material section, the understanding of metamorphosis and the animal life cycle is presented without going through a metamorphosis. In the material for the life cycle of animals with metamorphosis, material for the life cycle of animals with metamorphosis is displayed, which includes complete metamorphosis and imperfect metamorphosis. In the sample material for animals with perfect metamorphosis, examples of animals with complete metamorphosis and examples of metamorphosis in butterflies are shown. In the material section on examples of animals with incomplete metamorphosis, examples of animals with incomplete metamorphosis and examples of animals with incomplete metamorphosis are shown in grasshoppers. In the closing section, a summary of the material presented and evaluation is given.

The results of the development of Powtoon-based learning media products that have been developed have been tested for validity and are in the very predicate as a learning media. The results obtained are in line with research which states that students will be more enthusiastic in learning activities because students are more interested in learning media in which there are animated images, transitions, and even not only observing but also listening to the sounds contained in the media (Muskania et al., 2019). Using learning video media using the Powtoon application can optimize learning activities (Febriana & Wahyuningsih, 2019; Novita et al., 2019). Audio-visual learning media powtoon about self-concept in group guidance for students in elementary schools can effectively be used for classroom learning methods (Fitriyani, 2019; Kartowagiran et al., 2019). Interactive video learning media in science subjects for ecosystem component materials can improve students' understanding of the material. The research stated that through the process of making powtoon media, students' creative thinking skills from five aspects, namely fluency, flexibility, originality, elaboration, and evaluation. Based on the results of the analysis in the form of questionnaires and observation sheets, it was obtained that students were able to grow creative thinking skills (Laksono et al., 2020; Manurung, 2020). The learning outcomes of fifth-grade students in science learning using powtoon media are effectively used in improving student learning outcomes in science learning on earth's structure material (Maulana & Suwandi, 2019; Sutiarso et al., 2017). The PowToon learning media developed is practical and has a potential effect in increasing understanding of lecture material (Nurdiansyah et al., 2018; Sangsawang, 2020). Powtoon-based learning media is interesting and motivates students to learn (Hashim et al., 2020; Sukmanasa et al., 2020). Students really understand the material and are very interested in learning science so that it is effectively used in the learning process with animation video based on powtoon (Mayub et al., 2020; Wulandari et al., 2020). When compared with previous research, this time's media development is considered capable of perfecting aspects that were weaknesses in previous developments, because in this development, Powtoon-based learning video media was enhanced by adding voice dubbing so that the material delivered was clearer and understanding of the material. obtained by students become the same as each other. The use of animation in video learning media based on the Powtoon application on the media developed this time will be more diverse so that students are more interested in participating in the learning process.

This research implies that the developed product can be used as a reference in the learning process, especially on animal life cycle material because the developed media has been assessed as feasible and able to increase student motivation in participating in the learning process. It is hoped that the problems regarding the lack of innovative media and the low motivation of students in participating in the learning process can be resolved. Theoretically, this research can make a positive contribution to the world of education, especially in the use of learning media in the form of video-based learning that can improve the learning process in the classroom. In practice, this research is expected to provide innovative and varied learning solutions to create fun learning. However, the research also has some limitations in its implementation and development, namely the development of powtoon-based animated video media is limited to the science content of animal life cycle topics for fourth-grade elementary school students, powtoon-based animated video media was developed based on an analysis of the needs of teachers and fourth-grade elementary school students so that the media developed limited to field conditions, and limited time, energy, resources, and costs that caused the implementation and evaluation stages of the

ADDIE model used in the development of animation video media based on powtoon could not be carried out. Suggestions for other researchers, this research is used as a reference in developing similar media on different topics and other researchers can also continue this research at the implementation stage through the experimental stage.

## 4. CONCLUSION

Based on the results of the validity test that has been carried out, it can be concluded that the media developed is suitable for use with good categories. So that the animation video learning media based on Powtoon on the topic of animal life cycles in class IV deserves to be used as a reference in overcoming the problem of lack of innovative media which has an impact on the low motivation of students to participate in the learning process. Suggestions for other researchers, this research is used as a reference in developing similar media on different topics and other researchers can also continue this research at the implementation stage through the experimental stage.

## 5. REFERENCES


Adi, Y. K., & Widodo, A. (2018). Pemahaman Hakikat Sains Pada Guru Dan Siswa Sekolah Dasar. *Edukasi Journal*, *10*(1), 55–72. https://doi.org/10.31603/edukasi.v10i1.1831.

Agung, A. A. G. (2014). *Metodologi Penelitian Pendidikan*. Aditya Media Publishing.

Angraini, R. (2017). Karakteristik Media Yang Tepat Dalam Pembelajaran Pendidikan Kewarganegaraan (Pkn) Sebagai Pendidikan Nilai. *Journal of Moral and Civic Education*, *1*(1), 14–24. https://doi.org/10.24036/8851412020171116.

Arif*, S., & Muthoharoh, A. (2021). Pengembangan Media Pembelajaran Berbasis Powtoon dalam Meningkatkan Kemampuan Representasi IPA di Tengah Pandemi Covid 19. *Jurnal IPA & Pembelajaran IPA*, *5*(1), 112–124. https://doi.org/10.24815/jipi.v5i1.19779.

Arshad, A. M., Halim, L., & Nasri, N. M. (2021). Impact of integrating science and engineering teaching approach on students' achievement: A meta analysis. *Jurnal Pendidikan IPA Indonesia*, *10*(2), 159–170. https://doi.org/10.15294/jpii.v10i2.29839.

Astiwi, K. P. T., Antara, P. A., & Agustiana, I. G. A. T. (2020). Pengembangan Instrumen Penilaian Kemampuan Berpikir Kritis Siswa SD pada Mata Pelajaran PPKn. *Jurnal Ilmiah Pendidikan Profesi Guru*, *3*(3), 459. https://doi.org/10.23887/jippg.v3i3.29457.

Atmojo, S. E., Muhtarom, T., & Lukitoaji, B. D. (2020). The Level of Self-Regulated Learning and Self-Awareness in Science Learning in the Covid-19 Pandemic Era. *Jurnal Pendidikan IPA Indonesia*, *9*(4), 512–520. https://doi.org/10.15294/jpii.v9i4.25544.

Bakhri, S. (2019). Animasi Interaktif Pembelajaran Huruf dan Angka Menggunakan Model ADDIE. *INTENSIF: Jurnal Ilmiah Penelitian Dan Penerapan Teknologi Sistem Informasi*, *3*(2), 130. https://doi.org/10.29407/intensif.v3i2.12666.

Bujuri, D. A. (2018). Analisis Perkembangan Kognitif Anak Usia Dasar dan Implikasinya dalam Kegiatan Belajar Mengajar. *LITERASI (Jurnal Ilmu Pendidikan)*, *9*(1), 37. https://doi.org/10.21927/literasi.2018.9(1).37-50.

Febriana, M. B., & Wahyuningsih, F. (2019). Hasil Belajar Keterampilan Berbicara Bahasa Jerman Dengan Menggunakan Media Pembelajaran Video Berbasis Aplikasi Powtoon. *LATERNE*, *8*(2), 68–70. https://jurnalmahasiswa.unesa.ac.id/index.php/laterne/article/view/31663/28726.

Fitriyani, N. (2019). Pengembangan Media Pembelajaran Audio-Visual Powtoon Tentang Konsep Diri Dalam Bimbingan Kelompok Untuk Peserta Didik Sekolah Dasar. *Jurnal Tunas Bangsa*, *6*(1), 104–114. https://ejournal.bbg.ac.id/tunasbangsa/article/view/950.

Hamidah, I., Sriyono, S., & Hudha, M. N. (2020). A Bibliometric Analysis of Covid-19 Research using VOSviewer. *Indonesian Journal of Science and Technology*, *5*(2), 209–216. https://doi.org/10.17509/ijost.v5i2.24522.

Hartini, S., Firdausi, S., Misbah, & Sulaeman, N. F. (2018). The development of physics teaching materials based on local wisdom to train Saraba Kawa characters. *Jurnal Pendidikan IPA Indonesia*, *7*(2), 130–137. https://doi.org/10.15294/jpii.v7i2.14249.

Hashim, S., Masek, A., Abdullah, N. S., Paimin, A. N., & Muda, W. H. N. W. (2020). Students' intention to share information via social media: A case study of COVID-19 pandemic. *Indonesian Journal of Science and Technology*, *5*(2), 236–245. https://doi.org/10.17509/ijost.v5i2.24586.

Herayanti, L., Habibi, H., & Fuaddunazmi, M. (2017). Pengembangan Media Pembelajaran Berbasis Moodle pada Matakuliah Fisika Dasar. *Jurnal Cakrawala Pendidikan*, *36*(2), 210–219. https://doi.org/10.21831/cp.v36i2.13077.

Herliandry, L. D., Nurhasanah, N., Suban, M. E., & Kuswanto, H. (2020). Pembelajaran Pada Masa Pandemi Covid-19. *JTP - Jurnal Teknologi Pendidikan*, *22*(1), 65–70. https://doi.org/10.21009/jtp.v22i1.15286.

Irmansyah, J., Lumintuarso, R., Sugiyanto, F., & Sukoco, P. (2020). Children's Social Skills Through Traditional Sport Games In Primary Schools. *Jurnal Cakrawala Pendidikan*, *39*(1), 39–53. https://doi.org/10.21831/cp.v39i1.28210.

Jampel, I. N., Fahrurrozi, F., Artawan, G., Widiana, I. W., Parmiti, D. P., & Hellman, J. (2018). Studying Natural Science in Elementary School Using NOS-Oriented Cooperative Learning Model with the NHT Type. *Jurnal Pendidikan IPA Indonesia*, *7*(2), 138–146. https://doi.org/10.15294/jpii.v7i2.9863.

Kartowagiran, B., Wibawa, E. A., Alfarisa, F., & Purnama, D. N. (2019). Can student assessment sheets replace observation sheets? *Cakrawala Pendidikan*, *38*(1), 33–44. https://doi.org/10.21831/cp.v38i1.22207.

Laksono, D., Iriansyah, H. S., & Oktaviana, E. (2020). Pengembangan Media Pembelajaran Video Interakif Powtoon pada Mata Pelajaran IPA Materi Komponen Ekosistem. *Prosiding Seminar Nasional Pendidikan STKIP Kusuma Negara II*, 255–262. http://jurnal.stkipkusumanegara.ac.id/index.php/semnara2020/article/view/685/450.

Manurung, I. F. U. (2020). Project Based Learning Activities : Media Powtoon Dalam Pembelajaran Ipa Sd Untuk Menganalisis Keterampilan Berfikir Kreatif Mahasiswa. *ESJ (Elementary School Journal*, *10*(1). https://jurnal.unimed.ac.id/2012/index.php/elementary/article/view/19286.

Marlina, R., Puspaningrum, H., & Hamdani. (2017). Differentiation of test items between the high school biology olimpiad in north kayong and the national science olimpiad. *Jurnal Pendidikan IPA Indonesia*, *6*(2), 245–251. https://doi.org/10.15294/jpii.v6i2.10679.

Maulana, I., & Suwandi. (2019). Keefektifan Media Powtoon Dalam Pembelajaran Ipa Ditinjau Dari Minat Dan Hasil Belajar Pada Siswa Kelas V Sd. *Indonesian Journal of Conservation*, *8*(1). https://journal.unnes.ac.id/nju/index.php/ijc/article/view/22680.

Mayub, A., Suryani, E., & Farid, M. (2020). Implementation of Discovery Learning Model Based on Calor Characteristic Bricks Mixed by (Durio Zibethinus) and Coconut (Cocos Nucifera) Skin to Improve Students' Cognitive Learning Outcomes. *Jurnal Pendidikan IPA Indonesia*, *9*(2), 287–293. https://doi.org/10.15294/jpii.v9i2.23803.

Mithen, Onesimus, Arfandi, A., Raeny, & Rahmansah. (2021). Science teachers abilities in integrating population and environmental education with science subjects of junior high school in Mamasa regency, Indonesia. *Jurnal Pendidikan IPA Indonesia*, *10*(1), 81–91. https://doi.org/10.15294/jpii.v10i1.27012.

MS, B., Rahmawati, S., & Wardani, S. (2017). The Development of A Learning Media for Visualizing the Pancasila Values Based on Information and Communication Technology. *Jurnal Cakrawala Pendidikan*, *36*(3), 502–521. https://journal.uny.ac.id/index.php/cp/article/view/12748.

Mulyanti, B., Purnama, W., & Pawinanto, R. E. (2020). Distance learning in vocational high schools during the covid-19 pandemic in West Java province, Indonesia. *Indonesian Journal of Science and Technology*, *5*(2), 271–282. https://doi.org/10.17509/ijost.v5i2.24640.

Muskania, R. T., Badariah, S., & Mansur, M. (2019). Pembelajaran Tematik Menggunakan Media Video Scribe Pada Siswa Kelas Iv Sekolah Dasar. *ELEMENTARY: Islamic Teacher Journal*, *7*(1), 75. https://doi.org/10.21043/elementary.v7i1.4927.

Mustaqim, I. (2017). Pengembangan Media Pembelajaran Berbasis Augmented Reality. *Jurnal Edukasi Elektro*, *1*(1). https://doi.org/10.21831/jee.v1i1.13267.

Narut, Y. F., & Supradi, K. (2019). Literasi sains peserta didik dalam pembelajaran ipa di indonesia. *Jurnal Inovasi Pendidikan Dasar*, *3*(1), 61–69. http://jurnal.unikastpaulus.ac.id/index.php/jipd/article/view/214.

Novita, L., Sukmanasa, E., & Pratama, M. Y. (2019). Penggunaan Media Pembelajaran Video terhadap Hasil Belajar Siswa SD. *Indonesian Journal of Primary Education*, *3*(2), 64–72. https://ejournal.upi.edu/index.php/IJPE/article/view/22103.

Nurdiansyah, E., Faisal, E. El, & Sulkipani, S. (2018). Pengembangan media pembelajaran berbasis PowToon pada perkuliahan Pendidikan Kewarganegaraan. *Jurnal Civics: Media Kajian Kewarganegaraan*, *15*(1), 1–8. https://doi.org/10.21831/jc.v15i1.16875.

Paranna, M., & Airlanda, G. S. (2020). Pengaruh Model Pembelajaran Circuit Learning Berbantu Multimedia Dan Media Sederhana Terhadap Kreativitas Siswa. *JRPD (Jurnal Riset Pendidikan Dasar)*, *3*(1), 57–63. https://doi.org/10.26618/jrpd.v3i1.3231.

Pramita, P. A., Sudarma, I. K., & Murda, I. N. (2019). Pengaruh Model Pembelajaran Scramble Berbantuan Media Gambar terhadap Hasil Belajar IPA. *Jurnal Pedagogi Dan Pembelajaran*, *2*(2), 186. https://doi.org/10.23887/jp2.v2i2.17907.

Pratama, I. G. D. J., Dantes, N., & Yudiana, K. (2020). Thematic Learning Plan With A Nature Of Science Learning Model In The Fourth Grade Of Elementary School. *International Journal of Elementary Education*, *4*(4), 447–453. https://ejournal.undiksha.ac.id/index.php/IJEE/article/view/27208.

Rahayu, S., Bambut, K. E. N., & Fajaroh, F. (2020). Do different discussion activities in developing scientific argumentation affect students' motivation in chemistry? *Cakrawala Pendidikan*, *39*(3), 679–693. https://doi.org/10.21831/cp.v39i3.32228.

Rusydiyah, E. F., Indarwati, D., Jazil, S., Susilawati, S., & Gusniwati, G. (2021). STEM Learning Environment: Perceptions and Implementation Skills in Prospective Science Teachers. *Jurnal Pendidikan IPA Indonesia*, *10*(1), 138–148. https://doi.org/10.15294/jpii.v10i1.28303.

Sangsawang, T. (2020). An instructional design for online learning in vocational education according to a self-regulated learning framework for problem solving during the covid-19 crisis. *Indonesian Journal of Science and Technology*, *5*(2), 283–198. https://doi.org/10.17509/ijost.v5i2.24702.

Septyarini, Y. D. A., Gading, I. K., & Antara, P. A. (2021). Validity and Reliability: Early Childhood's Locomotor Capability Assessment Instruments. *Advances in Social Science, Education and Humanities Research*, *540*(Ictes 2020), 400–404. https://doi.org/10.2991/assehr.k.210407.271.

Setiyani, S., Putri, D. P., Ferdianto, F., & Fauji, S. H. (2020). Designing A Digital Teaching Module Based On Mathematical Communication In Relation And Function. *Journal on Mathematics Education*, *11*(2), 223–236. https://doi.org/10.22342/jme.11.2.7320.223-236.

Sukmanasa, E., Novita, L., & Maesya, A. (2020). Pendampingan pembuatan media pembelajaran Powtoon bagi guru Sekolah Dasar Gugus 1 Kota Bogor. *Transformasi: Jurnal Pengabdian Masyarakat*, *16*(1), 95–105. https://doi.org/10.20414/transformasi.v16i1.2140.

Sulfemi, W. B., & Mayasari, N. (2019). Peranan Model Pembelajaran Value Clarification Technique Berbantuan Media Audio Visual Untuk Meningkatkan Hasil Belajar Ips. *Jurnal Pendidikan*, *20*(1), 53–68. https://doi.org/10.33830/jp.v20i1.235.2019.

Sundari, N. (2016). Penggunaan Media Gambar Dalam Meningkatkan Keaktifan Siswa Dalam Pembelajaran Pengetahuan Sosial Di Sekolah Dasar. *EduHumaniora | Jurnal Pendidikan Dasar Kampus Cibiru*, *5*(1), 1689–1699. https://doi.org/10.17509/eh.v5i1.2836.

Sutiarso, S., Coesamin, C., & Nurhanurawati, N. (2017). The Effect of Various Media Scaffolding on Increasing Understanding of Students' Geometry Concepts. *Journal on Mathematics Education*, *9*(1), 95–102. https://doi.org/10.22342/jme.9.1.4291.95-102.

Toto, Yulisma, L., & Amam, A. (2021). *Improving Teachers' Understanding and Readiness in Implementing STEM through Science Learning Simulation*. *10*(2), 303–310. https://doi.org/10.15294/jpii.v10i2.27509.

Usmeldi, U., Amini, R., & Trisna, S. (2017). The Development of Research-Based Learning Model with Science, Environment, Technology, and Society Approaches to Improve Critical Thinking of Students. *Jurnal Pendidikan IPA Indonesia*, *6*(2), 318. https://doi.org/10.15294/jpii.v6i2.10680.

Wati, E. K., & Widiansyah, N. (2020). Design of learning media: Modeling & simulation of building thermal comfort optimization system in building physics course. *Jurnal Pendidikan IPA Indonesia*, *9*(2), 257–266. https://doi.org/10.15294/jpii.v9i2.23504.

Wulandari, Y., Ruhiat, Y., & Nulhakim, L. (2020). Pengembangan Media Video Berbasis Powtoon pada Mata Pelajaran IPA di Kelas V. *Jurnal Pendidikan Sains Indonesia (Indonesian Journal of Science Education)*, *8*(2), 269–279. https://doi.org/10.24815/jpsi.v8i2.16835.

Yustina, Syafii, W., & Vebrianto, R. (2020). The effects of blended learning and project-based learning on pre-service biology teachers' creative thinking skills through online learning in the COVID-19 pandemic. *Jurnal Pendidikan IPA Indonesia*, *9*(3), 408–420. https://doi.org/10.15294/jpii.v9i3.24706.

Zaenuri, Z., Sudarmin, S., Utomo, Y., & Juul, E. (2017). Habituation Model of Implementing Environmental Education in Elementary School. *Jurnal Pendidikan IPA Indonesia*, *6*(2), 206. https://doi.org/10.15294/jpii.v6i2.10200.