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Animated Videos Based on Problem-Based Learning on Social Sciences Subjects for Sixth Grade of Elementary School

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ABSTRAK

Terdapat kesenjangan antara kemajuan teknologi dalam dunia pendidikan dan kemampuan guru dalam memanfaatkannya. Meskipun peralihan menuju pembelajaran digital semakin mendominasi, namun masih banyak guru yang belum dapat menyesuaikan diri dengan teknologi informasi sebagai media pembelajaran. Penelitian ini bertujuan untuk mengembangkan video animasi berbasis problem-based learning pada mata pelajaran IPS Kelas VI SD. Penelitian termasuk dalam jenis penelitian pengembangan dengan menggunakan model ADDIE. Subjek yang dilibatkan pada penelitian ini ialah ahli isi pembelajaran, ahli desain pembelajaran, ahli media pembelajaran, 3 siswa untuk uji coba perorangan, dan 9 siswa untuk uji coba kelompok kecil. Pengumpulan data dilakukan dengan metode angket, wawancara, dan catatan lapangan. Data dianalisis menggunakan metode analisis data kualitatif, analisis data deskriptif kuantitatif, dan uji-t. Hasil penelitian menunjukkan bahwa, video animasi pembelajaran dengan inovasi model problem-based learning untuk IPS memiliki kualitas sangat baik dan cocok digunakan dalam pembelajaran. Penggunaan video animasi pembelajaran berbasis PBL terbukti efektif dalam meningkatkan pemahaman dan prestasi belajar siswa. Dapat disimpulkan bahwa, video animasi pembelajaran berbasis PBL memberikan dampak positif dalam mengembangkan keterampilan berpikir kritis dan kemampuan kolaboratif siswa. Penelitian ini berimplikasi pada peningkatan pengalaman pembelajaran siswa, peningkatan keterlibatan, dan pemahaman konsep secara aktif pada mata pelajaran IPS.

ABSTRAK

There is a gap between technological advances in the world of education and teachers' ability to utilize them. Even though the shift towards digital learning is increasingly dominating, there are still many teachers who have not been able to adapt to information technology as a learning medium. This research aims to develop animation videos based on problem-based learning in social studies subjects in Class VI Elementary School. The research is included in the type of development research using the ADDIE model. The subjects involved in this research were learning content experts, learning design experts, learning media experts, 3 students for individual trials, and 9 students for small group trials. Data collection was carried out using questionnaires, interviews and field notes. Data were analyzed using qualitative data analysis methods, quantitative descriptive data analysis, and t-test. The research results show that learning animation videos with an innovative problem-based learning model for social studies have very good quality and are suitable for use in learning. The use of PBL-based learning animation videos has proven to be effective in improving students' understanding and learning achievement. It can be concluded that PBL-based learning animation videos have a positive impact in developing students' critical thinking skills and collaborative abilities. This research has implications for improving students' learning experiences, increasing engagement, and actively understanding concepts in social studies subjects.

1. INTRODUCTION

Education is the most important need in developing human resource knowledge (Effendi, 2021; Mardhiyah et al., 2021). Education can produce quality individuals (Gunawan et al., 2020; Sudarmawan et al., 2020). Education will continue to develop and will increase as time goes by. The development of

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education greatly influences life, both in the development of science and technology (Mulyani & Haliza, 2021; Suryadi, 2015). Therefore, currently a lot of technology is being used to advance education. Educational technology is the study and ethical practice of facilitating learning and improving performance by creating, using, and managing appropriate learning processes and resources (Mustafa & Suryadi, 2022; Budiharto et al., 2019). This understanding leads to the definition of technological activities as generating, utilizing, and managing. Educational technology is expected to help learning for individuals. To support learning, there are five processes that must be completed: analysis, design, development, implementation, and evaluation (Sugihartini & Yudiana, 2018; Widiana, 2016).Learning media is anything that can be used to communicate ideas in order to direct students' attention, interests, thoughts and feelings during learning activities (Aprinawati, 2017; Hayati & Harianto, 2017).

Learning media is anything that can be used to send information from the sender to the recipient of the information in order to attract students' interests, ideas and feelings and facilitate the learning process. Learning materials must be able to hold students' interest during the learning process and motivate them to achieve learning goals in various fields, including social studies. However, technological advances cannot fully optimize the teaching and learning process in the classroom, so an appropriate learning approach is needed that can be combined with accessible media. Quality learning is instruction provided to students by teachers that gives them the opportunity to ask and answer questions in class while simultaneously assessing their capacity to learn. One learning model that can be applied to create quality learning is the problem based learning model. Problem based learning (PBL) is a teaching method that uses real problems as a context for students to develop critical thinking skills, solve problems, and gain knowledge (Susanto, 2020; Mustofa et al., 2016).This model makes students the main subject in learning (Muhartini et al., 2023; Tyas, 2017).In this way, students can be more active in class, thereby creating a quality generation. But in reality, teachers are more likely to use lecture techniques when presenting content to students in class, learning that teachers do for themselves (Latifah, 2023; Rimah Dani et al., 2023). The lecture method is a method that only uses words to communicate ideas, no learning aids, and only uses books. The lecture approach does not require technology or learning media. Through a lecture approach, teachers are able to distill large amounts of information and communicate the important points. Lecture techniques allow instructors to manage student enrollment. However, lecture activities make the teacher more dominant and the students become passive.

Based on interviews conducted at SD Negeri 1 Padangbulia, it was found that the school has high potential due to the availability of facilities such as computers, projectors, Wi-Fi in the computer lab room, and teachers who understand technology. However, until now teachers almost never use learning media. If learning media is used, it usually only makes students feel tired. As a result, some students even complain that learning feels boring, especially in social studies subjects. The lack of available learning media is caused by the large amount of time required by teachers to prepare the media. The lack of learning media has an impact on some students not reaching the KKM (minimum completeness criteria) set at 75 in social studies subjects in class VI. Based on an interview with the class VI teacher at SD Negeri 1 Padangbulia, learning media is really needed so that the learning process is not dominated by the teacher. This learning media is used so that students do not experience boredom and do not find it difficult to understand the teacher's lesson material. Apart from that, the interview results also revealed that teachers also lacked expertise in creating learning media. Until now, the only learning resources used by teachers are textbooks and instructional animated videos accessed from YouTube. Teachers also claim that the use of animated videos from YouTube has increased students' enthusiasm for learning. Methodologically, the teaching and learning process in class VI of SD Negeri 1 Padangbulia is still very traditional, especially for social studies subjects. To help students better understand and expand their knowledge, researchers want to create media that can attract students' interest and attention during the learning process. Researchers intend to develop animated learning videos by utilizing the problem based learning (PBL) learning paradigm. The hope is that the use of media in the form of animated videos based on problem based learning can improve the social studies learning outcomes of class VI students.

This research aims to develop animation videos based on problem-based learning in social studies subjects in Class VI Elementary School.The innovative problem-based learning model applied to learning media in the form of animated videos is expected to improve students' skills and pedagogy. Through this, it is hoped that student learning outcomes will improve, especially in social studies subjects. In addition, it is hoped that the results of this research can help students in learning by making it more interesting and real, which will increase students' understanding of the material.

2. METHOD

This research is development research using the ADDIE (Analysis, Design, Development, Implementation, Evaluation) development model in developing learning animation videos using Video Animationscribe. The analysis stage is carried out to understand learning needs and user characteristics (teachers and students). The design stage involves planning the structure and content of the learning animation video, referring to learning design theories and principles. The development stage involves creating animated learning videos using Videoscribe, with the addition of content, graphics, animation and other interesting elements. The implementation stage involves the use of animated learning videos in actual learning contexts by teachers and students. The evaluation stage is carried out to evaluate the effectiveness and efficacy of learning animation videos. This research involveslearning content experts, learning design experts, and learning media experts. Apart from that, it is also doneindividual trial stage and small group trial. The individual trial phase was carried out involving 3 class VII students at SMP Negeri 1 Singaraja, representing students with high, medium and low learning outcomes. Meanwhile, the small group trial stage involved 9 students from class VII who were selected from groups of students with high, medium and low learning outcomes. The student selection process is carried out based on the list of grades held by the homeroom teacher. Through a combination of these two trial stages, this research aims to obtain useful initial input and ensure the effectiveness of the product developed in the learning context at SMP Negeri 1 Singaraja.

Data collection was carried out using teacher-student questionnaire surveys, teacher interviews, and field notes. This development research uses several instruments to collect data. First, the learning content expert instrument is used to determine the quality of the learning material content in the media being developed. Second, a learning design expert instrument to determine the quality of learning design contained in the interactive learning multimedia that has been developed. Third, learning media expert instrument to determine the quality of interactive learning multimedia that has been developed. Fourth, individual and small group trial instruments to determine student responses regarding the use of interactive learning multimedia in the learning process. The instrument grid in this research can be presented in Table 1, Table 2, Table 3, and Table 4.

Table 1. The Learning Content Expert Instrument Grid

No	Aspect	Indicator	Item No	Many Items
1	Development Model used	Suitability of the development model used with the characteristics of the product produced Accuracy of reasons for selecting a development model	1,2	2
2	Development Stages	Suitability of the development stages carried out with the development model used Accuracy of depiction of development stages	3,4	2
3	Clarity, Practicality, and Collapse	Clarity of development stages based on the development model used The level of practicality of the development process implemented Collapse of development steps	5,6,7	3
4	Formative and Summative Evaluation	The accuracy of the evaluation design according to the model used Clarity of the evaluation instruments developed Validity and reliability of the evaluation instruments used The accuracy of the test subjects involved	8,9,10,11	4
		Amount		**11**

Source :Trollip (2001)with modifications

Table 2. The Learning Design Expert Instrument Grid

No	Aspect	Indicator	Item No	Many Items
1.	Learning Design Aspects	Clarity and suitability of the formulation of indicators, methods, steps, techniques, assessment instruments, and facilitate learning	1,2,3,4, 5,6,7,8	8
		Amount		**8**

Source : Dwiqi et al., (2020) with modifications

Table 3. The Learning Media Expert Instrument Grid

No	Aspect	Indicator	Item No	Many Items
1.	Text Aspects	Text clarity (text readability), text presentation, size and type of text.	1,2,3,4	4
2	Image Aspect	Image layout, quality, color balance and image attractiveness.	5,6,7,8,9	5
3	Animation Aspect	Quality, attractiveness, and suitability of the animation to the material presented	10,11,12	2
4	Audio Aspect	Clarity and suitability of the use of sound/musical sound and narrator.	13,14,15,16	4
5	Packaging Aspects	The attractiveness and suitability of the CD cover with the media content	17,18	2
6	Accessibility Aspect	Ease of access/use of learning multimedia and smooth interactive links	19,20	2
		Amount		**20**

Source : Dwiqi et al., (2020)with modifications

Table 4. The Instrument Grid for Individual Trial and Small Group Trial Stages

No	Aspect	Indicator	Item No	Many Items
1.	Aspects of Attraction	a. Ease of use.	1,2	18
		b. The attractiveness and accuracy of the presentation of text, images, animation, language and sound.	3,4,5,6,7,8 ,9,10	
		c. Ease, interest and motivation in learning.	11,12,13, 14,15,16	
		d. Evaluation	17,18	
		Amount		**18**

Source :Dwiqi et al., (2020)with modifications

In this research, several methods were used to analyze the data that had been collected. The first method is qualitative data analysis applied to obtain an in-depth understanding of the phenomenon being studied. The second method is quantitative descriptive data analysis used to present data with basic statistics. The final method is the t-test, used to test hypotheses and draw conclusions from the research results obtained.

3. RESULTS AND DISCUSSION

Results

This research uses the ADDIE model in product development. ADDIE is composed of five stages that must be passed. The first stage is analysis. At this stage, analysis is carried out including needs analysis, curriculum analysis, and analysis of student characteristics to identify problems at school. The results of the analysis show the low availability of learning media for science subjects in class VI elementary school. This is because it takes a lot of time to prepare learning media. As a result, some students have not reached the KKM score (minimum completeness criteria) set at 75 for class VI social studies subjects. Learning activities are also still traditional and are predominantly carried out by teachers. Therefore, students are more susceptible to boredom and find it difficult to understand the teacher's lesson material. Teachers also lack expertise in creating learning media.

The second stage is planning. At this stage, a design is made for developing learning media. Apart from that, preparation of concepts, materials and software used to develop animated videos is also carried out. The third stage is development. At this stage, the process of creating media and testing is carried out on experts and students to assess the validity and practicality of the media. The fourth stage is implementation. At this stage, media is implemented to measure the efficiency and effectiveness of the products that have been created. The fifth stage is evaluation. At this stage, an evaluation of the input and shortcomings of the learning video media is carried out, with the aim of assessing the feasibility and evaluating the product that has been developed.

In the design of this learning animation video product, the summation of educational technology experts is also presented. To receive input on the animated video created, this development product was sent to educational technology experts. Evaluation is carried out using a questionnaire that has been created. The item evaluation findings obtained by experts in educational technology show that 90% of educational technology experts achieved a very high level of qualification. To ensure that the material presented in learning media is accurate and in accordance with academic standards, an assessment by a material expert needs to be carried out. This assessment also helps find possible errors or deficiencies in the material, so that they can be corrected before use by students.

Based on the conversion of material expert test results, a result of 95% was obtained, which means the media has very good qualifications. Next, an assessment is carried out by a design expert. To ensure that the appearance and layout of learning media is attractive and easy for students to understand, an assessment must be carried out by a design expert. Furthermore, the proportion of excellent credentials as a result of learning design experts is 92.5%. This indicates that problem-based learning animation videos for students at SDN 1 Padangbulia class VI in social studies subjects do not need to be improved. Item validity tests, reliability tests, difficulty level tests, and differentiation power tests were carried out to check the learning outcomes test instruments. The examination was carried out in order to find out whether the learning outcomes test instrument could be used as a research tool. Furthermore, the results of the pretest and posttest normality tests in this study can be presented in Table 5.

Table 5. The Pre-test and Post-test Normality Test Results

Parameters		Pretest	Posttest
N		22	22
Normal Parameters	Mean	56.82	78.64
	Std. Deviation	11.500	8.753
Most Extreme Differences	Absolute	0.154	0.153
	Positive	0.121	0.097
	Negative	-0.154	-0.153
Statistical Tests		0.154	0.153
Asymp. Sig. (2-tailed)		0.187	0.199

Test results kolmogorov-smirnov shows that the significance value of the learning outcomes data before implementing PBL-based learning animation videos (pretest) is 0.187 > 0.05. Meanwhile, the significance value of student learning outcome data after implementing PBL-based learning animation videos (posttest) is 0.199 > 0.05. The significant value between pretest and posttest learning outcomes is greater than 0.05. Thus, it can be concluded that the data is normally distributed. Next, the results of the homogeneity of variance test can be presented in Table 6.

Table 6. The Variance Homogeneity Test Results

	Parameters	Levene Statistics	df1	df2	Sig.
Y	Based on Mean	1.830	1	42	0.183
	Based on Median	1.319	1	42	0.257
	Based on Median and with adjusted df	1.319	1	38.393	0.258
	Based on trimmed mean	1.920	1	42	0.173

Based on the homogeneity test results displayed in the table above, the average Significance (Sig.) value in the Variance column homogeneity test is 0.183 > 0.05. According to the homogeneity test requirements, data is considered homogeneous if the average significance value (Sig.) in the variance column homogeneity test is greater than 0.05. Next, hypothesis testing and t-test are carried out. The results of the hypothesis test and t-test can be presented in Table 7 and Table 8.

Table 7. The Hypothesis Test Results

Paired Group		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pretest	56.82	22	11.500	2.452
	Posttest	83.64	22	8.753	1.866

Table 8. The T-test Results

Group		Paired Differences					T	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Pretest-Posttest	-26.818	13.233	2.821	-32.685	-20.951	-9.506	21	0.000

The t-test sample is understood as a sig value based on the paired test output table. If the 2-tailed value is 0.0000.05, then Ho is rejected and Ha is accepted. It can be seen that the average learning outcomes between the pretest and posttest are different. This shows that there is a correlation between the use of PBL-based learning animation videos and increasing students' social studies learning outcomes in class VI elementary school. The average difference between pretest and posttest learning outcomes is 26,818. Thus, PBL-based animated learning videos have proven to be effective in teaching and learning activities.

Discussion

Videos Problem based learning (PBL) based learning animations for class VI social studies subjects at SD Negeri 1 Padangbulia have involved educational technology experts, subject matter experts and learning design experts in the development process. The development of learning media, especially animated learning videos, must highlight the importance of a collaborative-based approach involving various experts, such as educational technology experts, subject matter experts, and learning design experts. Evaluations from these experts show an excellent level of qualifications in every aspect evaluated. These findings demonstrate compliance with recommended practices for improving the quality and effectiveness of instructional animation videos. This shows that the learning animation video is declared valid and effective for use in social studies learning in class VI. The use of animated videos can improve student learning outcomes, especially in social studies subjects. The findings of this research are in line with the results of previous research which stated that the use of animated videos in classroom learning has proven effective in improving student learning outcomes (Jannah & Julianto, 2018; Ponza et al., 2018).

Applying the problem-based learning model to animated videos will provide space for students to be more active. This is in line with previous research which revealed that problem-based learning makes students active and creative (Samura, 2019; Simbolon & Tapilouw, 2015).Problem-based learning can make students individuals with a high level of critical thinking skills (Tanjung & Nababan, 2018; Simbolon & Tapilouw, 2015). PBL can also increase students' independence to solve problems independently (Reski et al., 2019; Raharjo, 2018).The relevance of problems that are appropriate and close to students' lives makes learning more meaningful (Tabun et al., 2020; Gazali, 2016; Ulya et al., 2016). Through the use of learning models in animated video media, teachers are able to optimally combine technology with education.

The strength of this research is the development of learning animation videos based on problem-based learning (PBL) which involves various experts such as educational technology experts, subject matter experts, and learning design experts. The existence of this expert team increases the quality and validity of the animated learning videos developed. In addition, the evaluation of these experts shows an excellent level of qualifications, with a high percentage of each expert. This shows that the learning animation videos are of good quality and are effective in supporting the learning of social studies subjects in class VI. The contribution of the results of this research is to provide an innovative learning solution using PBL-based animated learning videos. By utilizing the PBL model, this animated learning video encourages students to be actively involved in problem solving and developing critical thinking skills. This can improve students' understanding and learning achievement in social studies subjects.

This research has implications for improving students' learning experiences, increasing engagement, and actively understanding concepts in social studies subjects.PBL-based animated learning video innovations can enrich students' learning experiences and help them achieve better learning outcomes. This media can also increase the effectiveness and quality of learning. The limitation of this research is that it focuses on one school and one class only, so the generalization of the research results may be limited. Apart from that, this research does not carry out comparisons with other learning methods, so it cannot be compared directly with conventional learning methods. Recommendations for further research are to involve more schools and classes in the research to expand the generalization of the results, as well as to carry out comparisons with other learning methods to gain a more comprehensive understanding of the effectiveness of PBL-based animated learning videos in social studies learning.

4. CONCLUSION

An animated video innovation based on problem-based learning in social studies subjects in class VI elementary school achieved very good results. Evaluation by education experts shows that the majority of assessment results are in the very good category. The animated video developed also received a very good assessment after testing which supported its validity. Apart from that, the results of the evaluation of students showed a significant increase in their learning outcomes after using the animated learning video media. This shows that the use of problem-based animated video media can significantly improve student learning outcomes in social studies subjects in class VI SDN 1 Padangbulia in the 2022-2023 academic year.

5. REFERENCES

Aprinawati, I. (2017). Penggunaan Media Gambar Seri Untuk Meningkatkan Kemampuan Berbicara Anak Usia Dini. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini*, *1*(1), 72–80. https://doi.org/10.31004/obsesi.v1i1.33.

Budiharto, B., Triyono, T., & Suparman, S. (2019). Pengaruh Teknologi Pendidikan Pada Era Revolusi Industri 4.0. *SEUNEUBOK LADA: Jurnal Ilmu-Ilmu Sejarah, Sosial, Budaya Dan Kependidikan*, *6*(2), 96–144. Retrieved from https://ejurnalunsam.id/index.php/jsnbl/article/view/1629.

Dwiqi, G. C. S., & Sudatha, I Gde Wawan Sukmana, A. I. W. I. Y. (2020). Pengembangan Multimedia Pembelajaran Interaktif Mata Pelajaran IPA Untuk Siswa SD Kelas V. *Jurnal Edutech Undiksha*, *8*(2), 33–48. https://doi.org/10.23887/jeu.v8i2.28934.

Effendi, M. (2021). Pengembangan Sumber Daya Manusia dalam Meningkatkan Citra Lembaga di Lembaga Pendidikan Islam. *Southeast Asian Journal of Islamic Education Management*, *2*(1), 39–51. https://doi.org/10.21154/sajiem.v2i1.40.

Gazali, R. Y. (2016). Pembelajaran matematika yang bermakna. *Math Didactic: Jurnal Pendidikan Matematika*, *2*(3), 181–190. Retrieved from https://core.ac.uk/download/pdf/295416394.pdf.

Gunawan, I. G. N. P., Negara, I. G. A. O., & Manuaba, I. B. S. (2020). Pengaruh Model Pembelajaran Time Token Berbantuan Media Audio Visual Terhadap Kompetensi Pengetahuan IPA. *Jurnal Edutech Undiksha*, *8*(2), 159–170. https://doi.org/10.23887/jeu.v8i2.28966.

Hayati, N., & Harianto, F. (2017). Hubungan Penggunaan Media Pembelajaran Audio Visual dengan Minat Peserta Didik pada Pembelajaran Pendidikan Agama Islam di SMAN 1 Bangkinang Kota. *Al-Hikmah: Jurnal Agama Dan Ilmu Pengetahuan*, *14*(2), 160–180. https://doi.org/10.25299/al-hikmah:jaip.2017.

Jannah, M., & Julianto. (2018). Pengembangan Media Video Animasi Digestive System Untuk Meningkatkan Hasil Belajar Siswa Mata Pelajaran IPA Kelas V. *Jurnal Penelitian Pendidikan Guru Sekolah Dasar*, *6*(2), 254798. Retrieved from https://ejournal.unesa.ac.id/index.php/jurnal-penelitian-pgsd.

Latifah, D. N. (2023). Analisis gaya belajar siswa untuk pembelajaran berdiferensiasi di Sekolah Dasar. *LEARNING: Jurnal Inovasi Penelitian Pendidikan Dan Pembelajaran*, *3*(1), 68–75. https://doi.org/10.51878/learning.v3i1.2067.

Mardhiyah, R. H., Aldriani, S. N. F., Chitta, F., & Zulfikar, M. R. (2021). Pentingnya Keterampilan Belajar di Abad 21 sebagai Tuntutan dalam Pengembangan Sumber Daya Manusia. *Lectura : Jurnal Pendidikan*, *12*(1), 29–40. https://doi.org/10.31849/lectura.v12i1.5813.

Muhartini, M., Mansur, A., & Bakar, A. (2023). Pembelajaran Kontekstual dan Pembelajaran Problem Based Learning. *Lencana: Jurnal Inovasi Ilmu Pendidikan*, *1*(1), 66–77. https://doi.org/10.55606/lencana.

Mulyani, F., & Haliza, N. (2021). Analisis Perkembangan Ilmu Pengetahuan dan Teknologi (Iptek) Dalam Pendidikan. *Jurnal Pendidikan Dan Konseling*, *3*(1), 101–109. Retrieved from https://www.academia.edu/download/97827538/pdf.

Mustafa, P. S., & Suryadi, M. (2022). Landasan Teknologis sebagai Peningkatan Mutu dalam Pendidikan dan Pembelajaran: Kajian Pustaka. *Fondatia*, *6*(3), 767–793. https://doi.org/10.36088/fondatia.

Mustofa, Z., Susilo, H., & Muhdhar, M. H. I. Al. (2016). Penerapan Model Pembelajaran Problem Based Learning melalui Pendekatan Kontekstual Berbasis Lesson Study untuk Meningkatkan Kemampuan Memecahkan Masalah dan Hasil Belajar Kognitif Siswa SMA. *Jurnal Pendidikan: Teori, Penelitian, Dan Pengembangan*, 885–889. https://doi.org/10.17977/jp.v1i5.6298.

Ponza, P. J. R., Jampel, I. N., & Sudarma, I. K. (2018). Pengembangan media video animasi pada pembelajaran siswa kelas IV di sekolah dasar. *Jurnal Edutech Undiksha*, *6*(1), 9–19. https://doi.org/10.23887/jeu.v6i1.

Raharjo, D. (2018). Pembelajaran Berkarakteristik Inovatif Abad 21 Pada Materi Kemandirian Karir Peserta Didik Dengan Metode Pembelajaran Berbasis Masalah (Pbl) Di Smk Negeri 1 Adiwerna Tegal. *Cakrawala: Jurnal Pendidikan*, 87–104. https://doi.org/10.24905/cakrawala.vi0.170.

Reski, R., Hutapea, N., & Saragih, S. (2019). Peranan Model Problem Based Learning (PBL) terhadap

Kemampuan Pemecahan Masalah Matematis dan Kemandirian Belajar Siswa. *JURING (Journal for* Research in Mathematics Learning), 2(1), 49–57. https://doi.org/10.24014/juring.v2i1.5360.

RimahDani, D. E., Shaleh, S., & Nurlaeli, N. (2023). Variasi Metode Dan Media Pembelajaran Dalam Kegiatan Belajar Mengajar. *Al-Madrasah: Jurnal Ilmiah Pendidikan Madrasah Ibtidaiyah*, *7*(1), 372–379. https://doi.org/10.35931/am.v7i1.1829.

Samura, A. O. (2019). Kemampuan berpikir kritis dan kre.atif matematis melalui pembelajaran berbasis masalah. *MES: Journal of Mathematics Education and Science*, *5*(1), 20–28. https://doi.org/10.30743/mes.v5i1.1934.

Simbolon, E. R., & Tapilouw, F. S. (2015). Pengaruh pembelajaran berbasis masalah dan pembelajaran kontekstual terhadap berpikir kritis siswa SMP. *Edusains*, *7*(1), 97–104. https://doi.org/10.15408/es.v7i1.1533.

Sudarmawan, I. M., Abadi, I. B. G. S., & Putra, M. (2020). Model Pembelajaran SETS Berbantuan Media Audio Visual Terhadap Kompetensi Pengetahuan IPA. *Jurnal Edutech Undiksha*, *8*(2), 171. https://doi.org/10.23887/jeu.v8i2.28968.

Sugihartini, N., & Yudiana, K. (2018). ADDIE sebagai model pengembangan media instruksional edukatif (MIE) mata kuliah kurikulum dan pengajaran. *Jurnal Pendidikan Teknologi Dan Kejuruan*, *15*(2). https://doi.org/10.23887/jptk-undiksha.v15i2.14892.

Suryadi, S. (2015). Peranan Perkembangan Teknologi Informasi dan Komunikasi dalam Kegiatan Pembelajaran dan Perkembangan Dunia Pendidikan. *Informatika*, *3*(3), 133–143. https://doi.org/10.36987/informatika.v3i3.219.

Susanto, S. (2020). Efektifitas Small Group Discussion Dengan Model Problem Based Learning Dalam Pembelajaran Di Masa Pandemi Covid-19. *Sofyan Susanto*, *6*(1). https://doi.org/10.37471/jpm.

Tabun, H. M., Taneo, P. N. L., & Daniel, F. (2020). Kemampuan literasi matematis siswa pada pembelajaran model problem based learning (PBL). *Edumatica: Jurnal Pendidikan Matematika*, *10*(1), 1–8. https://doi.org/10.22437/edumatica.v10i01.8796.

Tanjung, H. S., & Nababan, S. A. (2018). Pengembangan perangkat pembelajaran matematika berorientasi model pembelajaran berbasis masalah (pbm) untuk meningkatkan kemampuan berpikir kritis siswa SMA Se-Kuala Nagan Raya Aceh. *Genta Mulia: Jurnal Ilmiah Pendidikan*, *9*(2). Retrieved from http://download.garuda.kemdikbud.go.id/article.php?article.

Trollip, S. . A. S. . (2001). *Multimedia for learning: methods and development (3rd ed.)*. Boston: Allyn and Bacon.

Tyas, R. (2017). Kesulitan penerapan problem based learning dalam pembelajaran matematika. *Jurnal Tecnoscienza*, *2*(1), 43–52. Retrieved from http://www.ejournal.kahuripan.ac.id/index.php.

Ulya, I. F., Irawati, R., & Maulana, M. (2016). Peningkatan kemampuan koneksi matematis dan motivasi belajar siswa menggunakan pendekatan kontekstual. *Jurnal Pena Ilmiah*, *1*(1), 121–130. https://doi.org/10.23819/pi.v1i1.2940.

Widiana, I. W. (2016). Pengembangan asesmen proyek dalam pembelajaran ipa di sekolah dasar. *JPI (Jurnal Pendidikan Indonesia)*, *5*(2), 147–157. https://doi.org/10.23887/jpi-undiksha.v5i2.8154.