

Development of Sparkol Videoscribe-Based Animated Video Learning Media on the Subject of IPAS Material Changes in the Form of Substances

Elisa Ratna Dewi^{1*}, Dewi Nilam Tyas¹

¹ Department of Elementary School Teacher Education, Faculty of Education and Psychological Sciences, Universitas Negeri Semarang, Semarang, Indonesia.

Received: April 17, 2024

Revised: May 20, 2024

Accepted: July 25, 2024

Published: July 31, 2024

Corresponding Author:

Elisa Ratna Dewi

elisaratnadewi2002@students.unnes.ac.id

DOI: [10.29303/jppipa.v10i7.7423](https://doi.org/10.29303/jppipa.v10i7.7423)

© 2024 The Authors. This open access article is distributed under a (CC-BY License)



Abstract: This research was conducted to develop learning media Sparkol Videoscribe-based animated video that is feasible and effective in improving the cognitive learning outcomes of students in the subject of Natural and Social Sciences (IPAS) material on changes in the form of substances in class IV SDN 1 Tambakrejo, Grobogan Regency. This study uses a quantitative approach with a development research method (R&D) based on the Borg and Gall development model. The data collection techniques used include tests (pretest and post test) and non-tests (observation, interview, documentation, and questionnaire) with research subjects 1 material expert, 1 media expert, teachers as practitioners and students totaling 9 on small-scale trials and 25 on large-scale trials. The results of validation by expert validators showed a high level of material feasibility and learning media design, namely 90.62% and 93.30%. This learning media is proven to be effective in improving student learning outcomes, indicated by the results of the t-test of the pretest and posttest values with sig (2-tailed) $0.000 < 0.005$ and $0.004 < 0.005$ while in the N-gain test there was an increase from 64.06 to 77.62 with a difference of 13.56 with a percentage of 0.39% including into the "medium" criteria. Thus, it can be concluded that it has been successfully developed Sparkol Videoscribe-based animated video learning media that is feasible and effective to use in learning to improve students' cognitive learning outcomes in IPAS subjects on material changes in the form of substances.

Keywords: Learning Media; Learning Outcomes; Sparkol Videoscribe

Introduction

Education consists of several components that are interrelated with one another, including teachers, students, curriculum, methods, infrastructure, teaching aids, and learning media (González-Pérez et al., 2022; Miranda et al., 2021). These components will create progress in the world of education if all of these components support each other. Therefore, in an effort to achieve advanced and quality education, it is

necessary to manage education creatively, effectively, and efficiently (Haleem et al., 2022). Thus, it is very necessary to develop the components of education in creating high-quality education.

The current curriculum is an independent curriculum, one of the bases for its implementation is Government Regulation No. 57 of 2021 concerning national education standards as amended by PP No. 4 of 2022, which is based on Permendikbudristek No. 7 of 2022 concerning content standards in early

How to Cite:

Dewi, E. R., & Tyas, D. N. (2024). Development of Sparkol Videoscribe-Based Animated Video Learning Media on the Subject of IPAS Material Changes in the Form of Substances. *Jurnal Penelitian Pendidikan IPA*, 10(7), 3622–3632. <https://doi.org/10.29303/jppipa.v10i7.7423>

childhood education, basic education levels, and secondary education levels in the independent curriculum structure there are 9 subjects that must be taught, one of which is IPAS, in this IPAS learning examines two subjects, namely science and social studies. Putri et al. (2021), explains that the nature of science includes four things, namely science as a process, science as a product, and science as a scientific attitude and science as technology. Therefore, in learning IPAS must include these four aspects so that students not only master science in the cognitive aspect but also able to apply in the surrounding environment (Widyasari et al., 2023). Therefore, in learning IPAS, it is hoped that teachers will be able to emphasize providing real experiences so that students are able to develop competencies within themselves. Therefore, in learning IPAS, it is necessary to provide learning media that suits the needs of students, so that the objectives of a lesson can be achieved.

Based on the results of previous research conducted by Ratnasari et al. (2019), it shows that there are still many learning media that have not been developed in accordance with the development of science and technology. This is caused by several factors, including the lack of teacher familiarity with technology. This condition makes it difficult for teachers to design and create technology based learning media. In addition, the limited facilities and infrastructure in schools are also one of the causes of the difficulty in developing learning media. This condition limits teachers' access to utilize technology optimally to support the learning process (Coman et al., 2020).

This learning problem also occurs in IPAS subjects at SDN 1 Tambakrejo, Grobogan Regency. Based on the results of interviews conducted with the fourth grade teacher of SDN 1 Tambakrejo Grobogan Regency, the cognitive learning outcomes of students are still low, especially in the subject of IPAS material on changes in the form of substances. As many as 15 (60%) of 25 students scored an average class score of 69 below the predetermined limit of completeness of 70. Facilities and infrastructure are still minimal and the lack of teacher innovation in developing IT-based learning media (Eze et al., 2020; Pokhrel et al., 2021). The low interest of students in IPAS subjects, can be proven by the results of a survey of students which shows that 98% of students do not like IPAS subjects, some of these problems are caused by the absence of IT-based media developed by teachers, the learning methods used are more dominant using the lecture method, and the lack of practical activities carried out by teachers with students (Baños et al., 2024; Landøy et al., 2020). Some of these problems occur especially in IPAS learning material changes in the form of

substances, students have difficulty in understanding the material presented by the teacher (Lestari, 2023), which should be in this material instilled concepts supported by the implementation of experiments on changes in the form of substances, but due to the limited learning media available, the implementation of learning is limited. Students only gain knowledge from the teacher's explanation through the lecture method (Darling-Hammond et al., 2020), so that this situation causes students to become more bored and bored in learning and less understanding of the material presented by the teacher.

This condition is caused by the lack of variation in learning, especially in the use of learning media (Hillmayr et al., 2020). Based on the survey results, 95% of students are more interested in learning by using learning video media because according to the results of interviews with students, students are more interested when learning using learning videos because they are interesting, fun, foster a sense of enthusiasm, and a sense of enthusiasm, and do not make them bored and bored when learning (Borgonovi et al., 2023; Licorish et al., 2018). But on the other hand, teachers have not been able to meet the needs of students due to limited time and abilities (Pozas et al., 2023).

Based on these problems, the research will make an alternative action that can be taken, namely by developing a learning media in the form of sparkol videoscribe-based animated videos. So the purpose of this research is to develop, test the feasibility, and effectiveness of sparkol videoscribe-based animated video learning media. Learning by using video is easier to understand than through text according to (Tarchi et al., 2021). This is because videos can display situations both audio and visual so that they can help students understand and enrich the exposure process, different when only using text. Using learning video media like this, of course, there are advantages to be gained, according to Lange et al. (2020), using video as a learning media can provide more experience in complementing the basic experience of students when conducting discussions, reading, and practice. In addition, using video is able to display a real display that can increase students' understanding and can be watched repeatedly if needed. In the development of media in the form of this video can be developed through Sparkol videoscribe software.

Videoscribe is a software that can be used to create an interesting and easy-to-use animation design. Videoscribe is another name for whiteboard animation video. There are various features presented in the sparkol videoscribe application, the most typical feature used is a whiteboard animation by describing a simulation of a hand drawing an animation. In addition, this software also presents various types of

letters, colors, animations, music, and sounds that can be adjusted according to user needs.

This is supported by research conducted by (Montenegro-Rueda et al., 2023), with the title "Development of Sparkol Videoscribe-based Learning Media on the Life Cycle of Living Things in Class IV SD/MI". Based on the results of the study, the product developed by the researcher has an influence on students' understanding of the material being taught. This is evidenced by the initial achievement of 60% of students who are able to achieve scores equal to and above the predetermined limit of completeness, then in the final trial of product operation with a total of 40 respondents, 87.50% of students were able to achieve scores equal to and above the predetermined limit of completeness.

Based on some of these explanations and conditions in the field, it can be said that the development of sparkol videoscribe-based animated video learning media is able to have an influence on significantly improving the cognitive learning outcomes of students. Therefore, researchers are interested in conducting research with the title "Development of Sparkol Videoscribe-based Animated Video Learning Media in IPAS Subjects Material Changes in the Form of Substances Class IV SDN 1 Tambakrejo Grobogan Regency".

Method

This research falls into the category of quantitative research. The quantitative approach in research provides more measurable information because it uses data as a basis for producing more measurable information. The method chosen for this research is the Research and Development (R&D) research method, as explained by Snyder (2019), R&D research is used to produce products and test the effectiveness of these products. In the context of this study, researchers will develop learning media in the form of animated videos using sparkol videoscribe for IPAS subjects, especially on the material of changes in the form of substances. In this study, it is based on the development model of Bord and Gall with ten steps to be used including; potential and problems; data collection; product design; design validation; design revision; product trial; product revision; usage trial; product revision; mass product manufacturing. The following is a chart of media development steps using the Bord and Gall model.

This research took place at SDN 1 Tambakrejo, Grobogan Regency, in February 2024. The research subjects consisted of one media expert and one material expert as well as teachers as practitioners. The smallscale trial involved 9 students at SDN 2 Ngembak, Grobogan Regency, while the large-scale trial involved

25 students at SDN 1 Tambakrejo, Grobogan Regency. The data collection methods used include observation, interview, documentation, and questionnaire. Observations were conducted before the research to collect basic data, while interviews were conducted with teachers and learners to understand the needs in research and development. In addition, questionnaires were used to assess the quality of media feasibility developed by media experts, material experts, teachers, and students during the small-scale trial. The instruments used in this study are pre-test questions and post-test questions, in creating a valid and reliable instrument, several test techniques are carried out including validity and reliability techniques to create valid and reliable questions. Then the data analysis techniques used in this study are normality test, homogeneity test, t-test, and n-gain test.

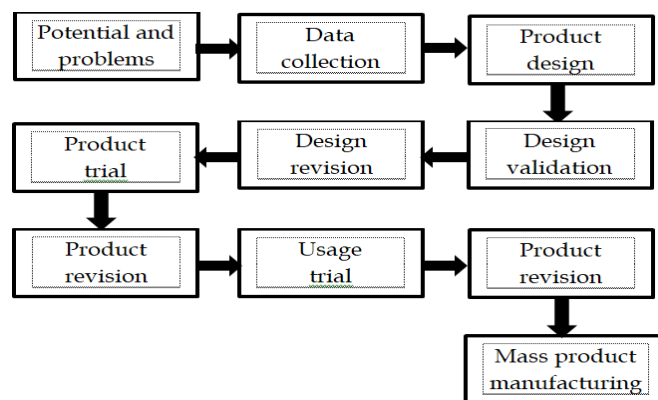


Figure 1. Bord and Gall model

Result and Discussion

The product produced in this study is a learning media in the form of sparkol videoscribe-based animated videos containing material on changes in the form of substances in class IV SDN 1 Tambakrejo Grobogan Regency. In developing this media, it is based on the development model of Bord and Gall (Firdayati et al., 2021), with ten steps to be used including; potential and problems; data collection; product design; design validation; design revision; product trial; product revision; usage trial; product revision; mass product manufacturing.

Potential Problems

Potential and problems can be found through the analysis process. The analysis process carried out by researchers is through an interview process with the fourth grade teacher of SDN 1 Tambakrejo, Grobogan Regency. Observation during the learning process and data on student learning outcomes on daily

assessments of IPAS subject matter on changes in the form of substances. At this stage the results obtained that the interest and learning outcomes of students in the subject of IPAS material on changes in the form of substances are still low. This is caused by: Facilities and infrastructure are still minimal and the lack of teacher innovation in developing IT-based learning media; The low interest of students in IPAS subjects, can be evidenced by the results of a survey of students which shows that 98% of students do not like IPAS subjects, this can occur due to several things including the absence of IT-based media developed by teachers, the learning methods used are more dominant using the lecture method, and the lack of practical activities carried out by teachers with students (Dejene, 2020; Keiler, 2018).

Data Collection

The data collection process in this research is: Interview with the fourth grade teacher of SDN 1 Tambakrejo; Observation of the learning process and student learning outcomes in the IPAS subject matter of changes in the form of substances; Questionnaire analysis of the needs of teachers and students; Analysis of the material to be used in the development of sparkol videoscribe-based animated video learning media. 5 Collect materials related to material changes in the form of substances. In this data collection process, the results obtained from interviews with class teachers showed that the interest and learning outcomes of students were still low, and there was no IT-based learning media development by the teacher. To find solutions to the problems that occur in students and teachers at SDN 1 Tambakrejo Grobogan district, researchers provide a needs analysis questionnaire to teachers and students to find out the needs of students and teachers which will later be used as a reference in the development of sparkol videoscribe-based learning media (Susilawati et al., 2024).

Product Design

In this step, the product design must be realized in the form of images, charts or brief descriptions that can function as a basis for making, and are able to make it easier for other parties to understand. The following is a prototype of the media that has been developed.

From the results of the prototype it can be explained that the media to be developed has several parts, namely the opening section which contains the learning video cover, developer profile, learning outcomes, and learning objectives. Then in the core section there is an explanation of the problems that students can solve after listening to the presentation

of the material contained in the core of the learning video, then next in the closing section there are several activities that participants can do, namely games and experiments on material changes in the form of substances, and in the closing section there are also quizzes that students must complete and conclusions from the presentation of material on the learning video. In developing this media design, there are several development basics used, including considering aspects of display, graphics, audio, and other interactive elements by adjusting the cognitive development of students, as well as ensuring that the media developed is interesting and easy for students to understand. that the learning media developed is interesting and easy for students to understand, this is in accordance with the explanation contained in the book entitled "Media Development" by LMS-SPADA Indonesia.



Figure 2. Initial view of the media



Figure 3. Problems in the learning video



Figure 4. Learning materials

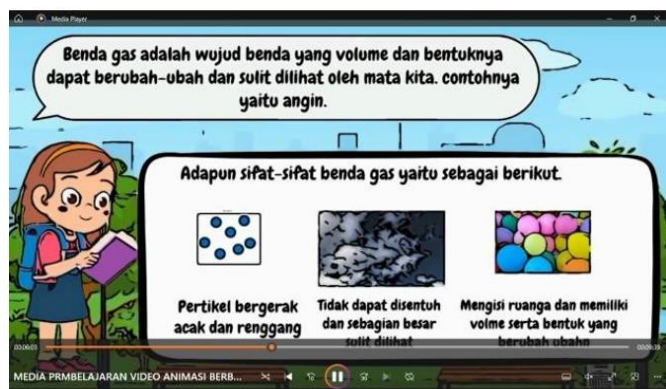


Figure 5. Learning materials



Figure 6. Learning materials



Figure 7. Quiz

Design Validation

Design validation is a process to provide an assessment conducted by experts on the product design that has been made is feasible or not (Sugiyono, 2021). Therefore, in this step, the product design will be validated by experts, both media experts and material experts by filling out a questionnaire provided by the researcher, which is then tested for feasibility through expert testing and product trials. Therefore, in this stage the researchers tested the validity and reliability of the pretest and posttest questions that had been prepared, so that the questions had been tested and were suitable for use in research. Based on the overall results of product trials by experts to assess the feasibility of media in the form of sparkol videoscribe based

animated videos on material changes in the form of substances, the following results were obtained.

Table 1. Expert Validation Scores

Feasibility Test	Score	Percentage(%)	Category
Material Expert	58	90.62	Very Worth
Media Expert	56	93.30	Very Worth

From the results of the validation test, it was found that the sparkol videoscribe-based animated video learning media was "very feasible" to use, which can be seen from the assessment percentage of 93.30% in the media validation test which shows a very feasible category with a note that improvements are needed in the developer profile section and the writing of words that are still wrong. This very feasible category is obtained from the results of the assessment of several aspects, namely aspects of suitability, display aspects, usage aspects, and aspects of excellence. Then in the material validation test, a percentage value of 90.62% was obtained with a very feasible assessment category with a note that the preparation and explanation of the material on the media was very feasible for grade IV. From the material validation test with the assessment results "very feasible" obtained from the results of the assessment of several aspects, namely aspects of competence, suitability aspects, and language aspects which show an average of very good assessment. After the material test was carried out and declared very feasible, the validity and reliability of the questions that would be used as pre-test and post-test questions were tested with the results that there were 30 questions tested valid and feasible to be used as pretest and posttest questions in the study.

Design Revision

Through the process and results of design validation, the weaknesses in the product design that have been made will be known. In this stage, the process carried out is design revision according to the suggestions and comments given by the experts. In the product design that has been tested for validity by media experts, it is noted that improvements are needed in the developer profile section and the writing of words that are still wrong (Dwivedi et al., 2023). Therefore, the experts' suggestions and comments are very important to be used as material for revising the product design. Then after the revision was made, the revised results were consulted again with the experts until the design was declared suitable for product testing.

Product Trial

Product trials were carried out by demonstrating the use of sparkol videoscribe-based animated video

media, carried out on a small scale involving 9 students. Sampling was carried out using purposive sampling technique, which is a sampling technique based on certain considerations (Andrade, 2021). Product trials were carried out through written tests (pretest and posttest) using the pre experimental one group pretest posttest design method. It is intended that researchers can compare the condition of students before and after using sparkol videoscribe-based animated video media accurately.

After the learning is complete, teachers and students are asked to fill out a questionnaire provided by the researcher. The questionnaire contains questions about the response of teachers and students to sparkol videoscribe-based animated video media that has been developed for IPAS learning. From the results of filling out the questionnaire, the results of the feasibility evaluation by teachers and students were obtained. From the results of filling out the feasibility test questionnaire by teachers and students, the following results were obtained: validated by experts, both media experts and material experts by filling out a questionnaire provided by the researcher, which is then tested for feasibility through expert testing and product trials.

Therefore, in this stage the researchers tested the validity and reliability of the pretest and posttest questions that had been prepared, so that the questions had been tested and were suitable for use in research (Yilmaz et al., 2023). Based on the overall results of product trials by experts to assess the feasibility of media in the form of sparkol videoscribe based animated videos on material changes in the form of substances, the following results were obtained:

Table 2. Teacher and Learner Feasibility Score

Respondents	Score	Percentage (%)	Category
Teacher	44	97.70	Very Feasible
Learners	43	95.30	Very Feasible

From the results of the table above, it can be concluded that sparkol videoscribe-based animated video learning media is very feasible to use in learning. this is supported by the results of the assessment of teachers and students from several aspects of the assessment contained in the teacher and student response questionnaire which shows a very good average value with the results of an assessment percentage of 95.30% of students and 97.70% of teachers with a very feasible assessment category.

Product Revision

After the product trial on a small scale, the product will be revised or improved according to the results of the teacher and learner response questionnaire on

sparkol videoscribe-based animated video media. The learning media is revised according to the suggestions and comments given by teachers and students in the teacher and learner response questionnaire. Based on the results of the teacher and learner response questionnaire in the product trial, it shows that there are no revisions or input given by teachers and learners with the average assessment given, namely the media is very feasible to use in the usage trial (Patras et al., 2023).

Trial Usage

After the product is revised, the next step is to conduct a usage trial, in this trial using a saturated sampling technique, namely by involving all members of the population. So that in this trial it was given to all fourth grade students of SDN 1 Tambakrejo with a total of 25 students. In this usage trial, it was carried out using pretest and posttest written tests through the pre experimental one group pretest posttest design method, this aims to determine the results of more accurate treatment because it can find out and compare the situation before and after the treatment.

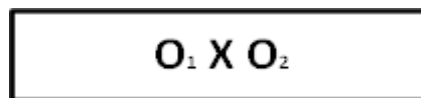


Figure 8. Model pattern of one group pretest posttest design

Description:

- O₁ : Pretest score
- X : Learning process with the treatment of learning media developed by researchers.
- O₂ : Posttest score

The evaluation results at the beginning of arning are used as pretest values and to determine the learning outcomes in the IPAS subject matter of changes in the form of substances before treatment. While the evaluation results at the end of learning are used as posttest values as well as to determine the progress of improving the learning outcomes of IPAS material on changes in the form of substances after treatment. This usage trial was carried out to get a conclusion whether the sparkol videoscribe-based animated video learning media developed in the IPAS subject matter of changes in the form of substances was effective and feasible to use in learning. To determine the effectiveness and feasibility of learning media, researchers used four test stages, namely normality test, homogeneity, t-test, and N-gain (Utaminingsih et al., 2022). The following is the product effectiveness test. In the product effectiveness test, it was carried out with the learning outcomes of students in two trial stages, namely the large group trial and the small group trial, with the following results:

Small Group Trial

Table 3. Small-scale Trial Results

Action	Average	Lowest Score	Highest Score	Number of students completed	Percentage of completeness (%)
Pretest	63.78	50	80	3	33.30
Posttest	74.56	60	90	6	66.60

Table 4. Large Group Trial

Action	Average	Lowest Score	Highest Score	Number of students completed	Percentage of completeness (%)
Pretest	64.16	50	83	9	36
Posttest	78.72	60	93	22	88

Table 5. Normality Test Results

		Tests of Normality						
		Kolmogorov-Smirnov ^a			Shapiro-Wilk			
	Class	Statistic	df	Sig.	Statistic	df	Sig.	
Participant Learning Outcomes	Small Group Pretest	0.134	9	0.200*	0.942	9	0.601	
	Small Group Posttest	0.188	9	0.200*	0.927	9	0.457	
	Large Group Pretest	0.148	25	0.164	0.956	25	0.349	
	Large Group Posttest	0.138	25	0.200*	0.970	25	0.640	

The results of the normality test using the Shapiro-Wilk test in SPSS Version 25, found that the pretest and posttest values for both groups, both small and large groups, showed a significance value greater than 0.05, namely 0.601 and 0.457 for the pretest and posttest values of the small group, 0.34 and 0.64 for the pretest and posttest values. large

group. Therefore, it can be concluded that both groups have normal data distribution. Furthermore, to find out whether two or more sets of sample data come from populations that have the same variance, calculations are carried out using the homogeneity technique. From the homogeneity test, the following results were obtained:

Table 6. Homogeneity Test Results

		Test of Homogeneity of Variance					
				Levene Statistic	df1	df2	Sig.
Outcomes	Based on Median			0.717	3	64.00	0.545
	Based on Median andwith adjusted df			0.717	3	62.56	0.546
	Based on trimmed mean			0.824	3	64.00	0.486

From the homogeneity results above, it can be proven that the sig value > 0.05. then the variance of two or more population groups or data samples is homogeneous. Then next to find out whether the learning media used is effective or not in learning, a

t-test is needed. The effectiveness of learning media is measured using test results using a two-party test as follows. $r_{count} > r_{table}$, then H_a is accepted, $r_{count} < r_{table}$, then H_o is accepted.

Table 7. T-test Results

				Paired Differences	95% Confidence Interval of the Difference				Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	
Pair1	Small Group Pretest Small Group Posttest	-10.778	8.01	2.67	-16.936	-4.619	-4.036	8	0.004
Pair2	Large Group Pretest Large Group Posttest	-14.560	8.72	1.74	-18.163	-10.957	-8.341	24	0.000

From this table, the results show that the sig (2 tailed) value is 0.004 and 0.000. Which if the sig value (2-tailed) > 0.005 then there is no significant difference between the learning outcomes of IPAS students in

the material on the form of substances on the pretest and posttest. Vice versa if the sig value (2- tailed) < 0.005 then there is a significant difference. Based on the t-test results in the table shows that sig (2-tailed)

0.000 <math>< 0.004 < 0.005</math>. So, from these results it is concluded that there is a significant difference between the pretest and posttest learning outcomes in the small group and large group tests. Therefore, it can be said that the learning media developed is "effective" to use and H_a is accepted.

Then to find out the increase in the average value in students, an N-gain test is needed from the results of the pretest and post test scores. From the results of the n-gain test, it was found that there was an average increase in the large group and small group trials, namely an average increase in the learning outcomes of students in learning IPAS material on changes in the form of substances, from the pretest results of 64.06 to 77.62. With a difference of 13.56 with a percentage of 0.39% which is included in the medium criteria. The average increase shows that the use of animated video learning media based on Sprakol Videoscribe is effectively used by fourth grade students of SDN 1 Tambakrejo, Grobogan Regency to improve the learning outcomes of IPAS material on changes in the form of substances.

This is in line with research conducted by Andika Dian Pratama in 2019 with the title "Development of Sparkol Videoscribe-Based Learning Media on the Life Cycle of Living Things in Class IV SD / MI" Based on the results of the research, the developed product has an influence on students' understanding of the material taught with an initial achievement of 60% who are able to achieve scores equal to and above the predetermined KKM, then in the final trial of product operation with a total of 40 respondents, students achieved a percentage of 87.5% of students able to achieve scores equal to and above the predetermined completeness limit.

This can occur because of differences in the response of students in learning when using sparkol videoscribe-based animated video learning media, students are more enthusiastic and active in participating in learning, as well as what happens in learning when a trial use is carried out in class IV SDN 1 Tambakrejo Grobogan Regency, students are more enthusiastic in participating in learning and also pay attention when the learning video is shown and when the teacher explains. Of course, with the response of students when participating in learning by being given treatment, namely the use of sparkol videoscribe-based animated video learning media will be able to help students understand the material being taught. But on the other hand, with an increase in the average score which is classified as moderate, there are several factors that influence both internal and external factors.

Internal factors themselves come from within the learners themselves such as the difficulty of

understanding the material quickly, while external factors come from outside the learners such as a less conducive school environment that causes learners' concentration to change. This is in accordance with research conducted by (Wahida et al., 2023) with the title of their research, namely "The Effectiveness of Using Learning Video Media to Improve Student Learning Outcomes" that in their research there was also an increase in the average score with a moderate category.

Product Revision

Product revision at this stage is carried out if there are weaknesses in the use of media in large samples. In the user trial, it is hoped that researchers can evaluate the performance of the product when used in independent learning (Abbas et al., 2019; Busetto et al., 2020). So that the evaluation results from this stage can be used as material for perfecting and making new products again (Nowell et al., 2017; Reike et al., 2018). At this stage there are no revisions that must be made based on the implementation of the media usage trial, this is because after several trials have been carried out. The products developed are feasible and effective for use in learning (Dhawan, 2020; Dziuban et al., 2018).

Mass Production

In this study, researchers did not carry out mass production due to limited time and cost. In addition, researchers only fulfill the needs of learning media in the IPAS subject matter of changes in the form of substances in class IV SD N 1 Tamabkrejo Grobogan Regency. Sparkol videoscribe-based animated video learning media that has been tested for feasibility by media and material expert validators (Anjelia et al., 2022; Wahyudi et al., 2022), and has been revised as a form of product improvement, can obtain a product that is declared feasible and effective for use in learning IPAS material changes in the form of substances grade IV in elementary schools (Sariningsih et al., 2023).

Conclusion

Based on the results of research on the development of sparkol videoscribe-based animated video learning media in learning IPAS material on changes in the form of substances in class IV SDN 1 Tambakrejo, it can be concluded that: Researchers developed sparkol videoscribe-based animated video learning media, this animated video media provides a display in the form of a PBL-based material explanation by providing a problem at the beginning of the video which is then given an explanation of the material in the form of changes in the form of substances. And at the end of the video there is a game,

experiment and quiz that will be done by students. Supported by an attractive video display with whiteboard animation features. This sparkol videoscribe-based animated video learning media is considered very feasible based on the assessment of media and material expert validators. The feasibility of material in media development reached 90.62%, while the feasibility of media development design reached 93.3%. Thus, the media developed is feasible to improve the learning outcomes of IPAS students on the material of changes in the form of substances in class IV SDN 1 Tambakrejo Grobogan Regency. Sparkol videoscribe-based animated video learning media is effectively used in learning IPAS material on changes in the form of substances. This is indicated by the results of the t-test which shows a significance smaller than 0.005, namely 0.000 and 0.004. And there was an increase in the average n-gain test results from pretest 64.06 to posttest 77.62, with a difference of 13.56 and a percentage of 0.39%, which included moderate criteria. There is a significant difference between pretest and posttest learning outcomes in small and large group tests, so that the learning media developed can be considered effective and feasible to use.

Acknowledgments

With the completion of this final project entitled "Development of Sparkol Videoscribe Based Animated Video Learning Media on IPAS Subjects Material Changes in Substance Forms Class IV SDN 1 Tambakrejo Grobogan Regency". The author would like to thank Allah SWT for his grace and blessings. Thank you to all parties involved in this research, Semarang State University, supervisors, principals, teachers, and students of SDN 1 Tambakrejo and SDN 2 Ngembak, Grobogan Regency. So that this research can run smoothly and can be completed on time.

Author Contributions

Research Design and Concept, E.R.D and E.R.D; field investigation and analysis, E.R.D; writing and drafting E.R.D and D.N.T; editing, E.R.D.

Funding

This research was independently funded by researchers.

Conflicts of Interest

The authors declare no conflict of interest.

References

- Abbas, J., Aman, J., Nurunnabi, M., & Bano, S. (2019). The Impact of Social Media on Learning Behavior for Sustainable Education: Evidence of Students from Selected Universities in Pakistan. *Sustainability*, 11(6), 1683. <https://doi.org/10.3390/su11061683>
- Anjelia, E., Arcana, I. N., & Kusumaningrum, B. (2022). Development of Learning Videos Using Videoscribe Tools in Statistics Learning at Junior High School of Muhammadiyah Koba. *Union: Jurnal Ilmiah Pendidikan Matematika*, 10(3), 371–380. <https://doi.org/10.30738/union.v10i3.13266>
- Baños, J. E., Blanco-Reina, E., Bellido-Estévez, I., Bosch, F., Cabello, M. R., Cambra-Badii, I., De La Cruz, J. P., D'Ocón, P., Ivorra, M. D., Ferrándiz, M., González-Correa, J. A., Martín-Montañez, E., Martos, F., Pavía, J., & Sanz, E. (2024). Beyond lectures and practical courses: Teaching pharmacology using imaginative pedagogical tools. *Pharmacological Research*, 202, 107130. <https://doi.org/10.1016/j.phrs.2024.107130>
- Borgonovi, F., Pokropek, M., & Pokropek, A. (2023). Relations between academic boredom, academic achievement, ICT use, and teacher enthusiasm among adolescents. *Computers & Education*, 200, 104807. <https://doi.org/10.1016/j.compedu.2023.104807>
- Busetto, L., Wick, W., & Gumbinger, C. (2020). How to use and assess qualitative research methods. *Neurological Research and Practice*, 2(1), 14. <https://doi.org/10.1186/s42466-020-00059-z>
- Coman, C., Țîru, L. G., Meseșan-Schmitz, L., Stanciu, C., & Bularca, M. C. (2020). Online Teaching and Learning in Higher Education during the Coronavirus Pandemic: Students' Perspective. *Sustainability*, 12(24), 10367. <https://doi.org/10.3390/su122410367>
- Darling-Hammond, L., Flook, L., Cook-Harvey, C., Barron, B., & Osher, D. (2020). Implications for educational practice of the science of learning and development. *Applied Developmental Science*, 24(2), 97–140. <https://doi.org/10.1080/10888691.2018.1537791>
- Dejene, W. (2020). Conceptions of teaching & learning and teaching approach preference: Their change through preservice teacher education program. *Cogent Education*, 7(1), 1833812. <https://doi.org/10.1080/2331186X.2020.1833812>
- Dhawan, S. (2020). Online Learning: A Panacea in the Time of COVID-19 Crisis. *Journal of Educational Technology Systems*, 49(1), 5–22. <https://doi.org/10.1177/0047239520934018>
- Dwivedi, Y. K., Kshetri, N., Hughes, L., Slade, E. L., Jeyaraj, A., Kar, A. K., Baabdullah, A. M., Koochang, A., Raghavan, V., Ahuja, M., Albanna, H., Albashrawi, M. A., Al-Busaidi, A. S., Balakrishnan, J., Barlette, Y., Basu, S., Bose, I., Brooks, L., Buhalis, D., ... Wright, R. (2023). Opinion Paper: "So what

- if ChatGPT wrote it?" Multidisciplinary perspectives on opportunities, challenges and implications of generative conversational AI for research, practice and policy. *International Journal of Information Management*, 71, 102642. <https://doi.org/10.1016/j.ijinfomgt.2023.102642>
- Dziuban, C., Graham, C. R., Moskal, P. D., Norberg, A., & Sicilia, N. (2018). Blended learning: the new normal and emerging technologies. *International Journal of Educational Technology in Higher Education*, 15(1), 3. <https://doi.org/10.1186/s41239-017-0087-5>
- Eze, S. C., Chinedu-Eze, V. C. A., Okike, C. K., & Bello, A. O. (2020). Factors influencing the use of e-learning facilities by students in a private Higher Education Institution (HEI) in a developing economy. *Humanities and Social Sciences Communications*, 7(1), 133. <https://doi.org/10.1057/s41599-020-00624-6>
- Firdayati, U., Darwan, D., & Kusmanto, H. (2021). Android-Based Media Development in Mathematics Lessons. *Eduma: Mathematics Education Learning and Teaching*, 10(1), 49. <https://doi.org/10.24235/eduma.v10i1.8138>
- González-Pérez, L. I., & Ramírez-Montoya, M. S. (2022). Components of Education 4.0 in 21st Century Skills Frameworks: Systematic Review. *Sustainability*, 14(3), 1493. <https://doi.org/10.3390/su14031493>
- Haleem, A., Javaid, M., Qadri, M. A., & Suman, R. (2022). Understanding the role of digital technologies in education: A review. *Sustainable Operations and Computers*, 3, 275-285. <https://doi.org/10.1016/j.susoc.2022.05.004>
- Hillmayr, D., Ziernwald, L., Reinhold, F., Hofer, S. I., & Reiss, K. M. (2020). The potential of digital tools to enhance mathematics and science learning in secondary schools: A context-specific meta-analysis. *Computers and Education*, 153, 103897. <https://doi.org/10.1016/j.compedu.2020.103897>
- Keiler, L. S. (2018). Teachers' roles and identities in student-centered classrooms. *International Journal of STEM Education*, 5(1), 34. <https://doi.org/10.1186/s40594-018-0131-6>
- Landøy, A., Popa, D., & Repanovici, A. (2020). Teaching Learning Methods. In *Collaboration in Designing a Pedagogical Approach in Information Literacy* (pp. 137-161). Springer International Publishing.
- Lange, C., & Costley, J. (2020). Improving online video lectures: learning challenges created by media. *International Journal of Educational Technology in Higher Education*, 17(1), 16. <https://doi.org/10.1186/s41239-020-00190-6>
- Lestari, N. A. P. (2023). Analysis of 2013 curriculum problems so it is changed into a merdeka curriculum. *Jurnal Pendidikan Dasar Nusantara*, 8(2), 263-274. <https://doi.org/10.29407/jpdn.v8i2.19229>
- Licorish, S. A., Owen, H. E., Daniel, B., & George, J. L. (2018). Students' perception of Kahoot!'s influence on teaching and learning. *Research and Practice in Technology Enhanced Learning*, 13(1), 9. <https://doi.org/10.1186/s41039-018-0078-8>
- Miranda, J., Navarrete, C., Noguez, J., Molina-Espinosa, J.-M., Ramírez-Montoya, M.-S., Navarro-Tuch, S. A., Bustamante-Bello, M.-R., Rosas-Fernández, J.-B., & Molina, A. (2021). The core components of education 4.0 in higher education: Three case studies in engineering education. *Computers & Electrical Engineering*, 93, 107278. <https://doi.org/10.1016/j.compeleceng.2021.107278>
- Montenegro-Rueda, M., Fernández-Cerero, J., Fernández-Batanero, J. M., & López-Meneses, E. (2023). Impact of the Implementation of ChatGPT in Education: A Systematic Review. *Computers*, 12(8), 153. <https://doi.org/10.3390/computers12080153>
- Nowell, L. S., Norris, J. M., White, D. E., & Moules, N. J. (2017). Thematic Analysis: Striving to Meet the Trustworthiness Criteria. *International Journal of Qualitative Methods*, 16(1), 160940691773384. <https://doi.org/10.1177/1609406917733847>
- Patras, Y. E., Naibaho, M. M., Karmila, N., Marini, A., & Hidayat, R. (2023). Development of Video Learning Media based on Filmora in Technology Topics for Elementary Students. *Pedagonal: Jurnal Ilmiah Pendidikan*, 7(2), 168-178. <https://doi.org/10.55215/pedagonal.v7i2.8983>
- Pokhrel, S., & Chhetri, R. (2021). A Literature Review on Impact of COVID-19 Pandemic on Teaching and Learning. *Higher Education for the Future*, 8(1), 133-141. <https://doi.org/10.1177/2347631120983481>
- Pozas, M., Letzel-Alt, V., & Schwab, S. (2023). The effects of differentiated instruction on teachers' stress and job satisfaction. *Teaching and Teacher Education*, 122, 103962. <https://doi.org/10.1016/j.tate.2022.103962>
- Putri, D. S., Pramswari, L. P., Suryana, S. I., & Widodo, A. (2021). Analysis of the Nature of Science in Elementary School Science Curriculum and Its Empowerment in Student Book. *Jurnal Penelitian Pendidikan IPA*, 7(3), 488-495. <https://doi.org/10.29303/jppipa.v7i3.763>
- Ratnasari, D., & Haryanto, H. (2019). Analysis of Utilization of Gadgets as Effective Learning Media in Innovation Education to improve Student Learning Achievement. *KnE Social Sciences*. <https://doi.org/10.18502/kss.v3i17.4671>
- Reike, D., Vermeulen, W. J. V., & Witjes, S. (2018). The circular economy: New or Refurbished as CE 3.0?

- Exploring Controversies in the Conceptualization of the Circular Economy through a Focus on History and Resource Value Retention Options. *Resources, Conservation and Recycling*, 135, 246–264. <https://doi.org/10.1016/j.resconrec.2017.08.027>
- Sariningsih, R., Permana, I., & Fujirahayu, A. R. (2023). Development of Multimodal Mathematics and Indonesian Language Books for Elementary School Learning in Bandung Barat. *AL-ISHLAH: Jurnal Pendidikan*, 15(3). <https://doi.org/10.35445/alishlah.v15i3.2947>
- Snyder, H. (2019). Literature review as a research methodology: An overview and guidelines. *Journal of Business Research*, 104, 333–339. <https://doi.org/10.1016/j.jbusres.2019.07.039>
- Sugiyono. (2021). *Metode Penelitian Luantitatif, Kualitatif*. Bandung: Alfabeta.
- Susilawati, W., & Yaniawati, P. (2024). Lateral Thinking Ability Through Challenge-based Learning with Sparkol Videoscribe. *KnE Social Sciences*. <https://doi.org/10.18502/kss.v9i8.15623>
- Tarchi, C., Zaccoletti, S., & Mason, L. (2021). Learning from text, video, or subtitles: A comparative analysis. *Computers & Education*, 160, 104034. <https://doi.org/10.1016/j.compedu.2020.104034>
- Utaminingsih, S., Fathurrahman, I., & Zuliyanti, N. (2022). E-module With Discovery Learning Model Based on Educational Games. *KnE Social Sciences*. <https://doi.org/10.18502/kss.v7i14.12006>
- Wahida, S., Tobing, M., & Sitompul, A. (2023). Development of media animated video to improve learning outcomes of Sunda siger bridal makeup. *Jurnal Pendidikan Vokasi*, 13(1), 12–18. <https://doi.org/10.21831/jpv.v13i1.52322>
- Wahyudi, D., & Amir Mz, Z. (2022). Development of video learning media assisted by Sparkol Videoscribe to facilitate the ability to understand mathematical concepts of students. *International Journal of Trends in Mathematics Education Research*, 5(3), 306–314. <https://doi.org/10.33122/ijtmer.v5i3.165>
- Widyasari, A., & Hermanto, H. (2023). The Effect of Cognitive Ability in Problem-Based Learning on Science Literacy Ability of Grade 4 Elementary School Students. *AL-ISHLAH: Jurnal Pendidikan*, 15(1), 719–728. <https://doi.org/10.35445/alishlah.v15i1.1612>
- Yilmaz, R., & Karaoglan Yilmaz, F. G. (2023). The effect of generative artificial intelligence (AI)-based tool use on students' computational thinking skills, programming self-efficacy and motivation. *Computers and Education: Artificial Intelligence*, 4, 100147. <https://doi.org/10.1016/j.caeai.2023.100147>