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DEVELOPMENT OF ARTICULATE STORYLINE INTERACTIVE MEDIA BASED ON PROBLEM BASED LEARNING IN SCIENCE LEARNING IN CLASS IV PRIMARY SCHOOL

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Abstract

This research and development aims to deliver products, determine the feasibility, and effectiveness of the interactive media Articulate Storyline based on Problem-Based Learning in science learning for grade IV elementary school students. This research uses the ADDIE development model which consists of five stages, namely Analysis, Design, Development, Implementation, and Evaluate. Product validation trials were carried out by involving material experts, media experts, linguists, and fourth grade students of SDIT Cendekia Islamic School Bekasi City. Information collection was obtained from observations, interviews with fourth grade teachers, and questionnaires. The results of the material expert validation were 95%, media experts 96.6%, and linguists 97.9%. Thus obtaining the average overall result of the experts validation is 96.5%. The results of the one to one product trial were 82.1%, small group 88.5%, and field test 92.5%. As well as getting an increase in learning outcomes from the pre-test 72.76 and post-test 93.72. Thus, this shows that the interactive media Articulate Storyline based on problem-based learning is feasible and effective to be used as an alternative or additional learning media for grade IV elementary school students.

Keywords : Interactive Media, Articulate Storyline, Problem Based Learning, Natural Sciences, ADDIE

Abstrak

Penelitian dan pengembangan ini bertujuan untuk menghasilkan produk, mengetahui kelayakan, serta keefektivan media interaktif Articulate Storyline berbasis Problem Based Learning pada pembelajaran IPA di kelas IV sekolah dasar. Penelitian ini menggunakan model pengembangan ADDIE yang terdiri dari lima tahapan, yaitu Analysis, Design, Development, Implementation, dan Evaluate. Uji coba validasi produk dilakukan dengan melibatkan ahli materi, ahli media, ahli bahasa, dan peserta didik kelas IV SDIT Cendekia Islamic School Kota Bekasi. Pengumpulan informasi diperoleh dari hasil observasi, wawancara dengan guru kelas IV, serta kuesioner. Hasil validasi ahli materi 95%, ahli media 96,6%, dan ahli bahasa 97,9%. Sehingga memperoleh rata-rata hasil keseluruhan dari validasi para ahli adalah 96,5%. Hasil uji coba produk one to one 82,1%, small group 88,5%, dan field test 92,5%. Serta mendapatkan peningkatan hasil belajar dari hasil pre-test 72,76 dan post-test 93,72. Dengan demikian, hal tersebut menunjukkan bahwa media interaktif Articulate Storyline berbasis Problem Based Learning layak dan efektif untuk digunakan sebagai media alternatif atau tambahan belajar peserta didik kelas IV sekolah dasar.

Katakunci: Media Interaktif, Articulate Storyline, Problem Based Learning, IPA, ADDIE.

Introduction

Education plays a very important role in educating the nation for students to develop their abilities and potential (*life skills*). Education is a conscious effort that can be done not only by

teachers, but also by families and communities in the learning process to develop the potential of students in various roles in their environment. Education in Indonesia is being required to follow developments that are closely related to 21st century education. Where education develops rapidly along with technological advances and has an influence on the learning process in schools which is expected to explore expertise in students. Expertise that includes the 4Cs, namely 1) *Creativity and innovation*; 2) *Critical thinking and problem solving*; 3) *Communication*; and 4) *Collaboration* (Pramusinta and Faizah, 2022, p. 104). Therefore, one of the competencies needed in supporting the learning process is critical thinking and problem solving in order to develop student skills. In developing these abilities, of course, it cannot be separated from every learning process including science learning. Science learning must be well designed so that students can develop their thinking skills in understanding, solving, and applying the concepts that have been learned.

In supporting the design of learning processes that can improve students' critical thinking skills by using learning models, such as *Problem Based Learning* (PBL). *Problem Based Learning* by including various real problems as an effort to provide student experience to develop problem-solving skills (Setyo, et al, 2020, p.19). The use of *Problem Based Learning* during the learning process can give students the opportunity to hone the ability to think actively in solving a problem to gain knowledge. In addition, it must also be assisted by supporting learning media. It is said to support science learning in elementary schools that are closely related to real life, there are no errors in understanding concepts during the learning process. To achieve this goal, the latest innovations are needed in making the learning media used. One of the media innovations in science learning that was originally in the form of print media can become digital media.

Learning media is a means used during learning to facilitate interaction and make the learning provided by teachers more effective, and efficient in terms of delivering material. Learning media also contains knowledge information that is channeled in order to stimulate the mind, attention, and desire of students in learning so that learning becomes more meaningful. One of the types of media in the learning process is interactive media. This interactive media is in the form of learning media using a combination of text, audio, and video at once. In addition, interactive media can also create an active, fun atmosphere, and follow the learning style of students by showing the interaction between media use, as well as the learning character of each student. It is expected that the use of interactive media can increase the interest and learning outcomes of each student.

In fact, when researchers made observations at SDIT Cendekia Islamic School Bekasi City during the transition period of learning from online to offline in grade IV, it was seen that quite a lot of students had not been able to solve a problem through questions given by the teacher, especially during science learning. Because of this, students find it difficult to provide real examples in everyday life. The teacher also mentioned that the use of media is not diverse due to the lack of teacher knowledge in the use of application facilities (*software*) to create learning media. Usually the media only races on theme books, learning videos made in the form of *Ms. Powerpoint* with writing colors that sometimes do not adjust to *the background* and additional *backsound* in the form of music only, then uploaded to *Youtube*. Make students feel bored and passive during learning so that the information provided is only remembered and not really noticed, and has an impact on student interest and motivation to learn.

The presentation of existing media is considered less interesting and tends to be boring, for that it is necessary to develop media that is interesting, interactive, easy to use, and can trigger students' critical thinking skills actively by applying the right learning model. One of them is with interactive media *Articulate Storyline* based on *Problem Based Learning*. *Articulate Storyline* itself is one of the *multimedia authoring tools* that can be used to create interactive learning media with content in the form of a combination of text, images, graphics, sound, animation, and video (Adnan, 2019, p. 2-3). The publication of Articulate *Storyline results* is in the form of web-based

media that can be accessed freely and easily on various devices, such as android, iOS, PC or laptop.

Based on some of the problems described above, it is necessary to have a solution by combining interactive media *Articulate Storyline* with *Problem Based Learning* to motivate thinking skills and increase students' interest in learning. The development of interactive media *Articulate Storyline* based on *Problem Based Learning* will be prepared using the stages of *Problem Based Learning* and applying it in a series of learning processes on learning media. The applied learning model begins with presenting real problems, then students seek information from various sources about the problems provided, both information from within the media and from outside the media, and find solutions to solve the problems given independently.

The development of *Articulate Storyline learning media* was chosen because it can be used in the learning process in the classroom (Arwanda, et al., 2020, p. 203) and is practical for teachers to apply to students in schools in delivering the content of the material taught (Utami and Wahyudi, 2021, p. 70). Based on these two data, it is proven that the use of interactive media *Articulate Storyline* can be an alternative as a learning medium during the learning process so that learning is not boring and more meaningful. Interactive multimedia oriented to *the Problem Based Learning* model is also suitable for use in the learning process (Anggreni, et al., 2021, p. 222). In other words, the use of interactive multimedia oriented to *the Problem Based Learning* model can be used by students when learning with teachers or when studying independently at home.

In the development of interactive media Articulate Storyline based on Problem Based Learning will be packaged in an interesting and innovative way, both from variations in images, letters, and colors. Therefore, researchers are interested in developing learning media conducted through research entitled "Development of Interactive Media Articulate Storyline Based on Problem Based Learning in Science Learning in Grade IV Elementary School", especially on alternative energy source materials. It is hoped that the products in this study can also be useful for students in developing critical thinking skills, solving problems, and increasing interest in learning to be active during the learning process.

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Methods

The research method used in this development is the Research and Development method or also called *Research and Development* (R&D). The model used in this *Research and Development research* is the development of the ADDIE model. The ADDIE model consists of five stages, namely: *Analysis*, *Design*, *Development*, *Implementation*, and *Evaluate* (Branch, 2009).

This interactive media development research involves respondents, testers, and user respondents. The interactive media *Articulate Storyline* based on *Problem Based Learning* developed will be tested by three experts, namely material experts, media experts, linguists. Meanwhile, the user respondents were grade IV elementary school students at SDIT Cendekia Islamic School Bekasi City.

Data collection techniques used in Problem Based *Learning-based* Articulate *Storyline interactive media development research* are observation, interviews, and questionnaires. Observations were made in grade IV SDIT Cendekia Islamic School Bekasi City to observe and know the learning process so that researchers can develop a product that suits learning needs. Furthermore, *an online* interview was conducted by giving several questions to grade IV elementary school teachers to obtain data as an analysis of research needs. While the questionnaire is to obtain data related to the feasibility of the product to be developed.

Data analysis used in Problem *Based* Learning-based *Articulate Storyline interactive media development research* is quantitative descriptive statistics. The calculation uses simple statistics in the form of a questionnaire using a Likert scale with 4 alternative answers with a score range of 1 to 4. The results of calculating the average score of the researchers' data are then

interpreted according to the criteria using the following references: (Riduan and Sunarto, 2013, p. 22)

Table 1. Score Interpretation Criteria

Information	Criteria Score Range
Very Less Feasible	≤ 25%
Less Decent	26% - 50%
Proper	51% - 75%
Very Worth It	76% - 100%

Results and Discussion

The results of this development research are digital products in the form of interactive media *Articulate Storyline* based *on Problem Based Learning* in *web* format that can be opened and read using electronic devices, such as laptops or *smartphones* so that it requires an internet connection, and does not require a lot of storage space. This interactive media *Articulate Storyline* based on *Problem Based Learning* contains science learning grade IV SD theme 9, namely Kayanya Negeriku with material on Alternative Energy Sources.

Research and development of interactive media *Articulate Storyline* based on *Problem Based Learning* uses ADDIE stages. The first stage is *Analyze* by collecting data through observation and interviews with students and grade IV teachers of SDIT Cendekia Islamic School Bekasi City. The following are the stages of analysis carried out, including:

First , conducting a needs analysis, information was obtained that the limitations of learning media used in science learning were one of the factors for the lack of interest of students, both in doing the tasks given and in participating in learning activities so that the average science score of grade IV students was less than KKM. This shows the need for learning media that are interesting, interactive, able to train cognitively in critical thinking of students, flexible, and easy to use by grade IV elementary school students such as interactive media *Articulate Storyline* based *on Problem Based Learning*.

The second conducted an analysis of students, obtaining information on the number of students in grade IV at SDIT Cendekia Islamic School Bekasi City totaling 25 students. In general, grade IV elementary school students aged 9-10 years. Based on the results of the study of cognitive development theory, the characteristics of grade IV students are at a concrete operational stage. At this stage, the logic of students has improved and is able to think systematically in solving problems. In addition, students also have the skills to read, write, and communicate with the surrounding environment. This can be seen based on the results of observations made by researchers that students are accustomed to reading thematic books, doing schoolwork given by teachers individually or in groups.

The third conducted material analysis, obtaining the results that the right material to be used in the development of interactive media *Articulate Storyline* based *on Problem Based Learning* is alternative energy source material. The material was chosen based on the results of an interview with a grade IV teacher of SDIT Cendekia Islamic School Bekasi City which stated that the results of daily assessments and PTS for grade IV students in odd semesters on energy source material were still below KKM.

The second stage is *Design*, after obtaining information from the analysis stage, researchers know that one of the science learning materials is quite difficult for students to understand. The material is prepared using the stages of *Problem Based Learning*. In addition, researchers also determine the indicators and learning objectives to be achieved.

Furthermore, the preparation of material content is carried out by researchers by collecting various sources as a reference in making material that is adjusted to the focus of the material. Researchers save the contents of the material to be used in *Microsoft Word*, this aims to facilitate the process of placing and editing the material. Then, researchers create a flow chart or

process sequence of interactive media *Articulate Storyline* based *on Problem Based Learning* to facilitate the development process. After that, researchers determined various application *software* that can be used to create interactive media *Articulate Storyline* based *on Problem Based Learning*, such as *Canva*, *Adobe Illustrator*, and *Articulate Storyline*.

The third stage, namely *Develop*, begins with the pre-production stage, namely by preparing devices on laptops and *tablets* in the form of *application software* used in making interactive media products *Articulate Storyline* based on *Problem Based Learning*. After the required application software is available, researchers create *backgrounds*, navigation buttons, illustrations of images related to Alternative Energy Source materials made using *Canva* application *software* and *Adobe Illustrator*. As for *the backsound* and *sound effects* downloaded from the *Pixabay website*. The complementary content of the media is collected and will later be packaged together with the material in the *Articulate Storyline* application *software*.

Furthermore, in the production stage, researchers realize the initial design or model that has been made into a development product in the form of interactive media *Articulate Storyline* based on *Problem Based Learning*. Before starting development, the appearance of this application only contained *blank slides* that resembled *Microsoft Powerpoint*.

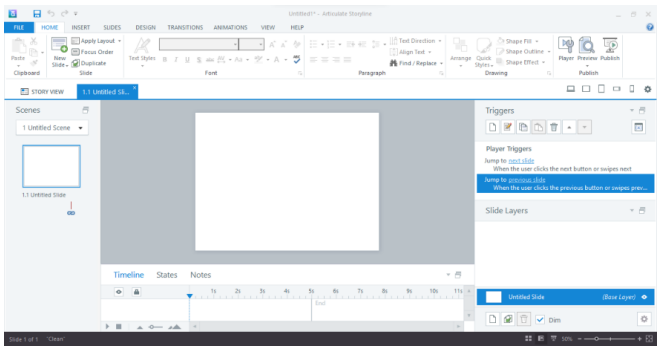

Figure 1. *Articulate Storyline* Before Development
(Source: author's document)

In the initial display on the *cover* there is a material title, namely "Alternative Energy Sources", and is equipped with a description of what learning models are used in interactive media. In addition, there is also a media backsound audio button and a start button to move to the next display.

Figure 2. Interactive Media Cover Display
(Source: author's document)

The main menu display contains buttons to lead users to each section in the media, such as the user guide menu, competency menu, problem-based learning menu combined with 5 stages of *Problem Based Learning*, material menu, quiz menu, and developer profile menu which has its own icon button. In addition, in the upper corner there is a corresponding user name based on the identity field on the *login menu*.

Figure 3. Interactive Media Cover Display
(Source: author's document)

Furthermore, in the post-production stage, Articulate Storyline *interactive media* based on *Problem Based Learning* has been completed, then this interactive media is ready to be validated by *expert reviews* consisting of material experts, media experts, linguists, and tested to students as users to obtain the results of the feasibility assessment of the developed product. Student trials go through several stages, namely the *one to one* stage for 3 students, the *small group* stage for 7 students, and the *field test* stage for 15 students.

The fourth stage is *Implement*, after the product passes the expert trial stage, the next stage of Problem Based *Learning-based* Articulate Storyline *interactive media* is implemented for grade IV students of SDIT Cendekia Islamic School Bekasi City. Implementation is carried out during face-to-face or direct science learning activities using interactive media *Articulate Storyline* based *on Problem Based Learning*. The provision of *pre-test* and *post-test* questions is carried out to determine the improvement of learning outcomes in the knowledge of students before and after using the product.

The fifth stage is *Evaluate*, there is validation data from the tests of experts, such as material experts, media experts, and linguists. In addition to the data of the test results of experts, there is also data on the results of student response questionnaires. The following is an expert test validation table and a table of student response questionnaire data results:

Table 2. Expert Test Validation

Trial Phase		Result	Criterion
Expert Test	Material Expert	95%	Very Worth It
	Ahli Media	96,6%	Very Worth It
	Linguists	97,9%	Very Worth It
Overall average		**96.5%**	**Very Worth It**

Based on table 2, it can be seen that *Articulate Storyline interactive media* based on *Problem Based Learning* obtained average results from experts of **96.5%** and was included in the **Very Feasible** criteria.

Table 3. Results of Student Response Questionnaire Data

No.	Respond	Result	Criterion
1.	*One to One*	82,1%	Very Worth It
2.	*Small Group*	88,5%	Very Worth It
3.	*Field Test*	92,5%	Very Worth It

Based on the table of student response questionnaire data results above, it can be seen that the interactive media *Articulate Storyline* based on *Problem Based Learning* has reached the **Very Feasible** criteria. With the interactive media *Articulate Storyline* based *on Problem Based Learning* can motivate and increase students' interest in learning, increase knowledge of thinking in solving problems, and provide new experiences both independently and in groups by learning to use variations of digital learning media in learning science material Alternative Energy Sources.

Conclusion

This research and development resulted in an interactive media product *Articulate Storyline* based on *Problem Based Learning* in science learning with the content of alternative energy source material in grade IV elementary schools. This product is in the form of digital media that researchers develop can be used as alternative media or additional learning for students. This research and development involves *expert review* tests or expert tests consisting of material experts, media experts, and linguists by obtaining overall assessment results with an average score of **96.5%** and included in the **Very Feasible** criteria. In addition, involving grade IV elementary school students to conduct media trials conducted at SDIT Cendekia Islamic School Bekasi City with the assessments obtained *One to one trial* 82.1%, small group *trial* 88.5%, and field test *trial 92.5%* are included in the Very Feasible criteria**.** The procedure in research and development of *Problem-Based Learning-based* Articulate *Storyline interactive media uses the ADDIE development model which consists of five stages, namely:* Analysis, Design, *Development*, Implementation, and *Evaluate* (Evaluation). The effectiveness of *Articulate Storyline* interactive media based *on Problem Based Learning* is at the implementation stage for students. At the time of *the pre-test*, students get a score of 72.76. Then, after learning using *interactive media Articulate Storyline* based on *Problem Based Learning*, students returned to do *post-test* questions and got a score of 93.72. Based on these results, the interactive media *Articulate Storyline* based on *Problem Based Learning* developed has increased so that it can be said to be effective.

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