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I-Spring Suite as an Alternative Media for Algebraic Expression

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Abstrak

Keterbatasan media pembelajaran berbasis teknologi yang tersedia di SMP Muhammdiyah 1 Godean memotivasi peneliti untuk mengembangkan media pembelajaran. Selain itu media pembelajaran berbasis teknologi juga dapat menambah alternatif media dan juga membantu kesulitan yang dialami peserta didik khususnya di materi bentuk aljabar. Penelitian ini menggunakan model pengembangan *Analysis, Design, Development, Implementation, and Evaluation* (ADDIE). Subjek dari penelitian ini adalah peserta didik kelas VII SMP Muhammadiyah 1 Godean. Sebelum diujicobakan ke dalam kelas besar maupun kecil, media pembelajaran akan divalidasi oleh ahli materi dan ahli media. Hasil dari penelitian diperoleh penilaian dari ahli materi diperoleh 84% dan dari ahli media memperoleh 95%. Sementara dari uji coba kelas kecil dan besar diperoleh 83% dan 82%. Menurut Islam dan Fahmi (2019) jika hasil prosentase dari validasi ahli materi, ahli media dan ujicoba kelas kecil serta besar memperoleh diatas 80% maka dinyatakan media tersebut sangat layak. Dengan demikian dapat disimpulkan bahwa media pembelajaran berbasis i-spring suite yang dikembangkan oleh peneliti layak digunakan.

Kata Kunci: Media pembelajaran, teknologi, bentuk aljabar, ADDIE, i-spring suite

Abstract

The limitation of technology-based learning media available at SMP Muhammadiyah 1 Godean motivate researcher to develop learning media. In Particular, technology based learning media can also be a supplement to alternative media and also assist the difficulties faced by the students, especially in algebraic expression material. This research uses the Analysis, Design, Development, Implementation and Evaluation (ADDIE) model. The subjects of this research were seventh grade students of SMP Muhammadiyah 1 Godean. Before being trialled into small and large classes, the learning media will be validated by material and media experts. The result of the research obtained an assessment from material expert 84% and media experts 95%. While from small and large class trials obtained 83% and 82%. According to Islam dan Fahmi (2019) if the percentage results from the validation of material experts, media experts, small and large trials are above 80%, it is declared that the media is very feasible. Thus it can be concluded that the i-spring suite based learning media developed by the researcher is feasible to use.

Keywords: Learning Media, Technology, Algebraic Expression, ADDIE, I-spring suite

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Introduction

Education is one of the most important means that aims to help the students develop themselves, so that they can become a generation with quality and potential. Through the perspective of the functions and objectives of education, it is clear that education in Indonesia wants to create an nation that is capable, faithful, devoted to God and has good knowledge and national insight [1]. One of the efforts to develop the potential of students is through the learning process. Therefore, education must be improved in order to develop qualified and potential students for the future.

One of the efforts to realise human resources who master science and technology is by developing the field of education. The rapid development of science and technology can be utilised to support the learning process. One of the things that can be done to support the learning process is by developing leaning instruments. Learning instruments are tools, materials, and media used to convey material in the learning process [2]. One of the factors to create an effective learning process is technology, because with technology the learning process becomes more diverse and interactive [3].

According to [4], one of the objectives of national education in the field of science is learning mathematics which is very important in science, besides that it also expresses scientific model. Based on [5] mathematics is a science that needed in all fields. Mathematics is a subject that begins from basic education to college. This is because mathematics can be used to analyse and solve complex problems. Mathematics can also be used to breakdown and simplify problem. Thus, it can be concluded that mathematics is very important, because it can be useful for analysing and solving problem.

Achieving mathematics learning objectives can be done by organising learning, communicating learning content, and compiling learning resources that can play a good role [6]. But in reality, learning mathematics is still not effective and fun. Mathematics learning is actually considered a difficult subject [7]. The methods used by mathematics teachers in learning include lectures, questions and answers, and assignments [8]. Therefore, to achieve the goals of learning mathematics. There are several aspects that must be considered. As for some of the content needed in learning mathematics, among others, the skills of students, the precision and accuracy of the student problem handling and the speed of students in thinking and processing problems to determine solutions.

Based on [6], it is stated that the difficulties of students when earing mathematics, especially algebraic expression material, are lack of understanding of concepts, inadequate understanding of questions and reading, and there are still mistakes in the calculation process. Difficulties in algebraic expression material faced by students, such as limited understanding of the elements of algebraic expression and difficulties in arithmetic [9]. In addition, the difficulties faced by students are difficulties in defining concepts and in explaining and also simplifying the operation of algebraic expression [11]. So that students generally still have difficulty in understanding the concept of algebraic expression and solving algebraic expression operations.

During the question and answer activity with the seventh grade mathematics teacher at SMP Muhammadiyah 1 Godean, it was found that the impact of online learning previously carried out by students was they were still not proficient in mastering multiplication and division. The learning method used at SMP Muhammadiyah 1 Godean still uses the drill method. This results in students still not able to understand the concepts and steps of solving mathematical problems. Students need to exercise and get direct examples so they need supporting media. Meanwhile, the learning resources used at SMP Muhammadiyah 1 Godean are only textbooks and student worksheets. Learning media that is often used through the Geschool application, but currently only used for student test or exam. Learning media for learning activities is not yet available including the algebraic expression material.

In the pre-research questionnaire conducted by researchers to 31 out of 32 students of seventh grade SMP Muhammadiyah 1 Godean, it was found that 74,2% of students considered mathematics ais a difficult subject. Then as many as 61,3% of students consider that algebraic expression material is part

of the difficult material in mathematics. In addition, in a brief question and answer with several students, they said they had difficulty in the sub-material of operations and applications of algebraic forms. In addition, the difficulties that students have faced in algebraic form material are about the steps of the work process and mistakes in the calculation process. Through this question and answer, the researcher also found that at SMP Muhammadiyah 1 Godean still did not use learning media other than the package book and worksheet referred to by the teacher. Meanwhile, improving the quality of students so that education is more advanced and overcoming problems in learning mathematics needs to be supported by learning media so that the learning objectives of mathematics can be achieved. Learning media can help develop students' mathematical problem solving skills and can be used in learning [11]. So that learning media can help in achieving the goals of the learning process.

Technological development can be utilised to developed learning media that will be used in the learning process. Learning media is a device that has an important role used to deliver material in the learning process by educators to students [12]. One of the benefits of learning media is to make the learning process more vivid and attractive to students, because it can display learning material in the form of sound, images, and video [13]. Learning media can be made with various kinds of software, one of which is *I-spring Suite*.

I-spring Suite is a software integrated with power point that is used to create learning media with several media components such as audio, visual and audiovisual so that the resulting media is ore interactive and attractive. Another benefit of *I-spring Suite* is that files created using PowerPoint can be transformed into flash format. In addition, *I-spring Suite* can be used to create learning videos as well as quizzes. Publication of content that has been used using I-spring Suite can be published on the LMS and can also be a smartphone application. *I-spring Suite* can help increase students' willingness in mathematics [14]. There are various learning media that can support learning mathematics to make it more interesting. One of them is learning media developed based on educational games and materials [15]. Learning media can also be developed based on smartphones [16]. Through the difficulties experienced by students and also the limitations of technology-based learning media available in mathematics learning at SMP Muhammadiyah 1 Godean. So, researchers are interested in conducting research on the development of learning media on algebraic form material using *I-spring Suite*

Methods and Data

Learning is the process of interaction between students and learning resources in a learning environment [17]. Learning is a process of internalisation of knowledge that occurs in the classroom. This learning process has the activities of students and educators supported by media, tools, methods, and teaching materials that are in accordance with the needs in the classroom [18]. While mathematics is a structured subject, in learning it we first understand the easiest material to complex material [19]. Mathematics is one of the subjects that support the development of science and technology in this era and in the future [20]. Mathematics is a subject that uses reasoning so that mathematics is considered something difficult to learn [21] and mathematics is still a subject that is feared even though mathematics is useful in everyday life [22].

Mathematics learning is a series of activities that have been planned to build students involvement to be active in the sense of having desire to build potential about mathematics [23],[24]. This is reinforced by the statement in [25] that mathematics learning is a process and an effort to help students build their knowledge. Mathematics is a subject that must be taught at every school level [26]. The achievement of mathematics education can be seen from students being able to complete mathematics learning tasks, students being able to apply the goals of mathematics education in everyday life, apply it, make mathematics an important part of students' lives. Therefore, learning media is needed to be able to support the achievement of mathematics learning goals.

Learning media comes from two words, namely media and learning. In general, media is an intermediary of information that comes from a source of information to be received by the recipient. Meanwhile, learning is a process of communication and interaction as a form of educational effort by condition the learning process of students [6]. Learning media is a distributor of messages or information on learning materials presented by educators [27]. According to [28], learning media is everything that can be used to facilitate the learning process. Learning media is an intermediary for the communication process between educators as teachers or facilitators to convey material and students as recipients of messages.

Another opinion, by [29] learning media is everything that is used to convey messages and can stimulate the thoughts, feelings, attention, and willingness of students so that it can encourage a deliberate, purposeful, and controlled learning process. Learning media is one of the factors in achieving the goals of the learning process. This is because the media has a role and function that is directly or indirectly in the learning process.

I-spring Suite is a learning software that can be integrated with Microsoft PowerPoint software. Furthermore, said [30], I-spring Suite can convert presentation files from Microsoft PowerPoint into flash and SCORM/AICC forms, which are commonly used in learning with e-learning LMS (learning management system). The resulting media format is HTML5 and can be converted into mobile applications. With various interesting features, I-spring Suite application can help facilitate educators in the learning process to be more attractive, interactive and effective.

I-spring Suite provides many options for educators in creating an online or offline based e-learning by utilising Microsoft Power Point presentation application. I-spring Suite is developed to support e-learning and can insert various forms of media so that the resulting learning media will be more attractive, including being able to record and synchronise presenter videos, add flash and you-tube videos, import or record audio and create unique navigation and design. In addition, I-spring Suite can support the presentation of learning evaluations in various forms such as True of False (true or false), Multiple Choice (multiple choice), Multiple Response (multiple response), Matching (matching), Sequence (sorting), numeric (numbers), Fill in the blank (fill in the blank answers), Short answer (short answer), essay (description) and so on [31].

The strengths of I-Spring Suite are that it is integrated with Microsoft Power Point. I-spring can insert various media such as flash, video, images, audio, etc., easily distributed in flash form that can be used anywhere and optimised for the web, can create quizzes with various types of questions such as true/false, multiple choice, multiple response, type in, matching, sequence, numeric, fill in the blank, and multiple choices text. I-spring suite works as add-ins, developed to support e-learning media, Quiz Maker allows users to create intelligent quizzes and surveys. In addition, the weakness of I-spring Suite is that it still needs to be collaborated with supporting media [32]. Therefore, its use is supported with Microsoft Power Point.

This research used development research methods. Research and development (R&D) method is a scientific way to research, design, produce and test products that have been produced [33]. The product developed in this development research is learning media made using Ispring Suite software.

The development model used in this research is the ADDIE development model. ADDIE stands for Analysis, Design, Development, Implementation, and Evaluation. The ADDIE model is a model used to analyse the interaction of each development component whether it is in accordance with the existing phases and based on the needs obtained [34]. The ADDIE development model was used in this study because this model is one of the models that is regular and easy to understand and each phase is in accordance with the development research conducted. The ADDIE model used has five stages, namely analysis, design, development, implementation, and evaluation. The stages of the research model can be seen in the following figure 1:

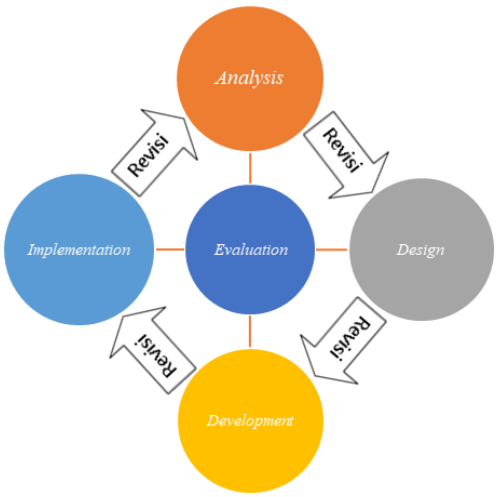

Figure 1. ADDIE development model

(Source: Sugiyono, 2019: 766)

The analysis stage is the stage for analysing learning needs and defining what students will learn. The design stage is the process of designing products that are in accordance with learning needs. The development stage is the stage for making products that have previously been designed by selecting and determining methods that are suitable for learning needs. Before starting the next stage, product trials are carried out first. The trial was carried out through several stages, starting from validation by material experts and media experts and then field trials by students. After the media has been validated, then the media will be field tested by students of SMP Muhammadiyah 1 Godean. This trial is divided into 2 stages, namely, small class trials and large class trials. The implementation stage is the stage of applying or using the product that has been made to determine the feasibility of the product. The evaluation stage is a stage to assess the product made at each step or stage is appropriate and assess the product can fulfil learning needs. The subjects of this research were students of SMP Muhammadiyah 1 Godean.

In this research, the types of data used are qualitative data and quantitative data. In addition, the data collection methods and instruments carried out in this study were interviews and questionnaires as data collection instruments to obtain the necessary data. After obtaining the data, the next step is to analyse the data with the descriptive analysis stage for qualitative data and questionnaire data analysis for quantitative data. Quantitative data analysis was carried out with the provisions of the questionnaire score as follows:

Table 1. Scoring Condition

Description	Score
Very Good	4
Good	3
Enough	2
Very Less	1

(Source: Islam dan Fahmi, 2019:626)

From the data that has been obtained, the percentage of media feasibility can be calculated using the following formula :

$$K = \frac{F}{N \times I \times R} \times 100\% \qquad (1)$$

Description :
K = Feasibility percentage
F = Number of response answers
N = Highest score in the questionnaire
I = Number of questions in the questionnaire
R = Number of respondents

(Source: Hera, et all., 2014:225)

Furthermore, the feasibility percentage is interpreted according to the following table 2.

Table 2. Interpretatation of feasibility

No	Percentage	Criteria
1.	80% < K ≤ 100%	Very Feasible
2.	60% < K ≤ 80%	Feasible
3.	40% < K ≤ 60%	Feasible Enough
4.	20% < K ≤ 40%	Less Feasible
5.	0% ≤ K ≤ 20%	Not Feasible

(Sourcer: Islam dan Fahmi, 2019:627)

Learning media is said to be feasible to use if the learning media assessment gets a percentage of more than 60% with decent or very feasible criteria.

Result and Discussion

This research produces learning media made using I-spring Suite on algebraic expression material for junior high school grade VII. This learning media can be accessed by smartphone. This development research was conducted with the five stages of the ADDIE development model. These stages are Analysis, Design, Development, Implementation and Evaluation.

The analysis stage is the first stage carried out in pre-planning. This early stage is carried out to obtain an overview of the learning media to be developed. Based on interviews with teachers and the results of a pre-research questionnaire conducted at SMP Muhammadiyah 1 Godean, it was found that students had difficulty in algebraic expression material, one of which was about the operation of algebraic expressions. In addition, information was obtained that the learning resources used at SMP Muhammadiyah 1 Godean were only textbooks and Student Worksheets and learning media for learning activities were not yet available including in algebraic expressions material. Therefore, learning media is needed on algebraic expression material to support the learning that is carried out.

The design stage is carried out by researchers to design learning media that will be developed according to needs. At this stage the researcher collects references and compiles the material to be presented on the learning media. Then, designing the elements that will be added to the learning media and also the arrangement of the assessment instrument of the product to be developed. The instruments compiled include questionnaires for material experts, media experts, and student responses.

The next stage is the development stage. At this stage of development, researchers carry out the manufacture of learning media products based on the results of the design in the previous stage. Making learning media begins with compiling a learning media display design. Then prepare some illustrations that will be added to the learning media. Furthermore, the preparation of content from making the front page, instructions for use, activity menu pages, CP, TP, ATP, algebraic form material, example problems, exercise problems, quizzes, bibliography, and author biography. The preparation is done with PowerPoint and I-spring Suite. After developing the media, the next step is to validate the learning media that has been developed. This stage is carried out to provide an assessment of the learning media that has been developed. Validation is carried out by material experts and media experts. Validation conducted by material experts aims to obtain an assessment in the form of a percentage of feasibility and feedback on the material presented in the learning media that has been developed. Feedback from material validators is used for improvements to the product developed in order to get a final product that is feasible to use. Then the assessment of the material on the learning media by the material expert gets the results of the percentage of feasibility of 84% so that the learning media is included in the very feasible category because the interpretation results meet the interval 80% < K ≤ 100%. The following table 3. are the results of the calculation of the percentage of feasibility by the material expert.

Table 3. Calculation Results Percentage of feasibility by Material Experts

No	Validator	Percentage	Criteria
1	Experts I	78%	Feasible
2	Experts II	90%	Very Feasible
Average of percentage		84%	Very Feasible

Meanwhile validation conducted by media experts obtained a percentage result of 95% so that the learning media was included in the very feasible category because the interpretation results met the interval 80% < K ≤ 100%. The following table 4. are the results of the calculation of the percentage of feasibility by media experts.

Table 4. Calculation Results Percentage of feasibility by Media Experts

No	Validator	Percentage	Criteria
1	Experts I	96%	Very Feasible
2	Experts II	94%	Very Feasible
Average of percentage		95%	Very Feasible

The implementation stage is carried out after the learning media has been developed and improved in accordance with criticism and suggestions from material experts and media experts. Then it is trialled to VII grade students of SMP Muhammadiyah 1 Godean. The trial will be carried out twice, namely, small class and large class trials. This stage is done to find out the responses and suggestions of students to the learning media that has been developed. The small class trial was conducted face-to-face by taking 6 students while the large class trial was attended by 31 students of class VII SMP Muhammadiyah 1 Godean.

Based on the trials conducted the percentage of feasibility through the student response questionnaire was 82% in the small class trial and 83% in the large class trial. So that the average percentage of the overall learner response is 82% which results in the learning media being included in the very feasible category because the interpretation results meet the interval 80% < K ≤ 100%.

The following table 5. is a recapitulation of the calculation of the percentage of feasibility by the students responses questionnaires.

Table 5. Calculation Results Percentage of feasibility by student response

NO	Trials	Average of Percentage	Criteria
1	Small Class	82%	Very Feasible
2	Large Class	83%	Very Feasible
Average total		82%	Very Feasible

The evaluation stage is the last stage of the ADDIE development model. At this stage, it is carried out to assess whether each development process and product is in accordance with predetermined provisions. The stages of the development process are reviewed again that they are in accordance with the specified provisions. Then the media is assessed based on media and material expert validation and media trials on students. It can be seen from the results of the validation of material and media obtained a percentage of feasibility that meets the criteria is very feasible while from the trial of students also meet the criteria is very feasible. From both, it is concluded that the learning media is suitable for use in the learning process that talks about algebraic expression material.

Conclusion

The product developed, namely learning media on algebraic form material with the ADDIE development model in this study, is declared feasible to use. The products resulting from this development research in the form of learning media using I-spring Suite on algebraic form material obtained a percentage of feasibility from material expert validation of 84% including a very feasible criteria. While the results of media expert validation obtained 95% which is included in the very feasible criteria. Then, the results of the response of students who got a percentage of feasibility of 82% in the small class trial and 83% in the large class trial and included in the very feasible criteria. Based on these results, it can be said that the learning media developed by researchers is feasible to use and utilize in learning activities.

The learning media that has been developed should be utilized in the learning process, so that it can help students in understanding the material. In addition, in the future it is necessary to develop more learning media using I-spring Suite on other materials in order to support learning activities.

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