

Developing AKM Problem-Oriented Websites as Learning Media for Flat Shapes

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ABSTRAK

This research is motivated by the inability of students to comprehend the concept and correctly answer questions on flat shapes in literacy. This research is a development study with the goal of creating a flat shaped, website oriented learning resource for junior high school class VIII students regarding AKM questions. The ADDIE development model is employed. Interviews, questionnaires for validity and practicality tests, and tests in the form of a pretest and posttest were employed as the data gathering instruments. Ten eighth-grade students from SMPN 13 Malang who participated in the AKM program served as the field trial participants. In order to evaluate the validity, applicability, and efficacy of data collection procedures, tests, questionnaires, and interviews are used. The media validity test yields a percentage of 91.4% (more than 90%), the validity test yields a percentage of 94% (more than 90%), the practicality percentage is 90.25% (more than 90%), and the Paired t-test yields a significant difference between the pretest and the posttest.

ABSTRACT

Kata Kunci:

Pengembangan, Media
Pembelajaran
Berbasis Website,
Pertanyaan AKM

Penelitian ini dilatarbelakangi oleh ketidakmampuan siswa dalam memahami konsep dan menjawab pertanyaan tentang bentuk datar dalam literasi. Penelitian ini merupakan studi pengembangan model ADDIE dengan tujuan menciptakan sumber belajar berbasis website mengenai pertanyaan AKM untuk siswa kelas VIII SMP. Instrumen pengumpulan data yang digunakan adalah wawancara, kuesioner untuk uji validitas dan praktikabilitas, serta tes dalam bentuk pretest dan posttest. Sepuluh siswa kelas VIII SMPN 13 Malang yang berpartisipasi dalam program AKM menjadi peserta uji lapangan. Untuk mengevaluasi validitas, aplikabilitas, dan efektivitas prosedur pengumpulan data, digunakan tes, kuesioner, dan wawancara. Uji validitas media ini menghasilkan persentase 91,4% (lebih dari 90%), uji validitas materi menghasilkan persentase 94% (lebih dari 90%), persentase praktikabilitas adalah 90,25% (lebih dari 90%), dan uji t berpasangan menunjukkan adanya perbedaan yang signifikan antara pretest dan posttest.

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Introduction

Minimum Competency Assessment (AKM) is one of the government's initiatives as a policymaker to enhance students' mathematical proficiency. The national assessment measures literacy and numeracy as one aspect of students' learning (Nurhalisa, [2021](#)). One crucial literacy skill that must be mastered is numeracy. This is due to the fact that numeracy literacy is associated with the process of making decisions based on mathematical information that can be found in the form of everyday symbols, numbers, and data (Hendrawati, [2020](#)). According to the Center for Assessment and Learning in 2020, one accomplishment of AKM learning in the area of flat shapes is that students are able to comprehend the characteristics of flat shapes and can apply the Pythagorean Theorem.

In fact, some students are still having trouble comprehending the dense material. Observations show that students continue to struggle with understanding concepts, applying formulas, and answering questions involving literacy. There is a general lack of understanding of the idea of flat shapes, according to (Fitriani, [2016](#); Isrotun, [2014](#)). Understanding of concepts and students' mastery of the subject matter are still low, which makes it difficult for them to comprehend and solve literacy problems (Fatqurhohman, [2016](#)). Due to the large number of properties and formulas that each plane shape has, students have trouble remembering information, including plane shape properties and formulas. (Sandri, [2018](#)).

There are a number of reasons why students struggle to master flat shapes. Students are taught standard concepts and procedures and that learning activities are concentrated solely on textbooks full of symbols and formulas that students must memorize, mathematics instruction still emphasizes memorizing formulas and calculating. Students who lack comprehension. Besides that, According to (Unaenah, [2020](#)) One of the other factors is that the subject matter is 1) abstract, so even when students only hear lectures or see media, they still don't fully grasp it. 2) Unsuitable media usage there are differences in how students react to the learning materials used in class. Learning that is solely based on books makes students feel bored because it is too uninteresting and monotonous, but learning that uses interactive media, like videos or pictures, makes learning more interesting and fun (Faradila, [2018](#)). Therefore, it can be concluded that the use of supportive learning media can result in good learning, but that it also easily causes students to become bored.

One of the geometric with basic concepts that makes it difficult for students to retain information is flat shapes (Atiqoh, 2019). It is impossible to learn communication skills through verbal means alone; therefore, tools or media that can concretize

abstract information are required (Yanto, [2019](#)). The concept of flat shapes must therefore be illustrated in educational media.

The use of learning media as a tool or resource helps the learning process. Learning outcomes are known or are included in the tools or materials used as teaching aids (Hodiyanto, [2020](#)). Learning media serves as an informational and message-transmitting medium between teachers and students, enabling effective and efficient learning (Sungkono, [2022](#)). Even the success or failure of learning is influenced by the learning media that is used, so learning media are a crucial component of learning (Atsani, [2020](#)).

Good learning materials are interactive, which means they can inspire and motivate students to participate more in class (Cahdriyana, [2020](#)). In order to increase students' interest in learning and understanding abstract learning concepts, interactive learning media is packaged as computer or mobile software with engaging visual animations (Rusman, [2011](#)). E-learning, or the use of web-based learning resources, has historically been prevalent in the learning process. One of them is the website, which is frequently used as a learning tool. Sites, also known as websites, are another way to learn (Candra, [2020](#)). Websites offer opportunities to make educational activities more engaging and interactive and have the potential to be developed as learning media. This is due to students can easily access them wherever they are and whenever they want.

The use of web-based learning media can create an effective, interactive, interesting learning process besides that it can generate motivation and enthusiasm for student learning (Nurseto, [2011](#)). The use of the web as a learning medium provides several advantages, namely: 1) students can do independent learning so that they can increase and expand knowledge, 2) students are more enthusiastic about learning, because the appearance of learning media is not monotonous so students can do other activities such as observing and trying, 3) web-based learning media provide additional learning resources that can be used to enrich learning material, and 4) this learning media is easily accessible to students anywhere and anytime.

There are various studies that have created websites as learning tools, including (Aditya, [2018](#); Septia, [2021](#); Shabrina, [2019](#)). Some of these studies used websites that were valid, usable, and produced as learning resources as opposed to ones that were focused on AKM questions. In the meantime, other research uses literacy videos (Nurhalisa, [2021](#)) but these studies do not use websites. These studies are based on the development of learning media based on the Minimum Competency Assessment using Microsoft PowerPoint Spin media (Vachruddin, [2021](#)) and the development of media modules (Sulistyorini, [2022](#)).

The purpose of this study is to create a website for use by students that is reliable, usable, and effective. It is anticipated that the development of an AKM-focused learning media website will be an engaging teaching tool and aid in students' understanding of the concepts of area and circumference of flat shapes as well as flat shape characteristics.

Method

The research method used is research and development (R&D) using the ADDIE development model, which has five stages: analysis, design, development, implementation, and evaluation. A website that is focused on AKM questions in flat shapes is the end result of this study. The final product will be tested on class VIII students who are chosen to use the AKM as part of SMPN 13 Malang.

The data and information to be obtained in this study were taken using research instruments in the form of interviews, questionnaires, and tests. The interviews conducted were unstructured interviews to find information, find problems, and produce data that would be needed to develop learning media. Questionnaires are used to test the validity and practicality of learning media. While the test is used to test the effectiveness of the intervention by comparing the results of the pretest and posttest, the processing of the validity and practicality questionnaire uses a Likert scale in the table 1.

Tabel 1. Category score of *Skala Likert*

Quantitative data	scoring
Very good	4
Good	3
Not enough	2
Not good	1

Analyses with the following formula were used to evaluate the validity and applicability (Putro, [2022](#); Rosiyanti, [2022](#)).

$$Presentase\ respon = \frac{jumlah\ skor}{jumlah\ skor\ maks} \times 100\%$$

Based on the percentage findings of the achievement level in Tables 2 and 3, the product assessment category is determined (Aswardi, [2019](#)).

Table 2. Criteria of product validity

Achievement level (%)	Category
90 – 100	Very Valid
80 – 89	Valid
65 – 79	Moderately Valid
55 – 64	Less Valid
0 – 54	Not Valid

Table 3. Criteria of product practical

Achievement level (%)	Category
90 – 100	Very Praktical
80 – 89	Praktical
65 – 79	Moderately Praktical
55 – 64	Less Praktical
0 – 54	Not Praktical

Additionally, using the Paired-Sample T Test, homogeneity test, and normality test, which will all be analyzed using the SPSS software, we will assess the efficacy of the pretest and posttest.

Result and Discussion

This research produced a product in the form of an AKM question-oriented website on flat shapes. This media was developed based on the stages of the ADDIE development model with the following development stages: Analysis, at this stage a needs analysis is carried out. The aim is to obtain information on the needs used to develop learning media. The main activity is analyzing the needs in the form of student character in participating in learning, student learning methods, obstacles faced by students in learning, school facilities. The conclusion drawn from this analysis is that media must be used as a tool to transmit data structure content. The website's use can be utilized to disseminate information and by students for autonomous learning, and its medium is in line with analysis requirements in terms of student characteristics, learning restrictions, and supporting resources.

Design, designing learning materials that incorporate learning desires from flat building material modeled after AKM questions should be done at this level. The initial step was gathering reference materials from numerous sources, including the 2017 Revised Edition of the Mathematics Student Book of the Republic of Indonesia and various online sources. The creation of a website framework is the following phase. At this step, validation sheets are also created in the form of questionnaires to examine the validity, usability, and effectiveness of learning media in addition to producing instructional media. Tests must be used to determine whether learning media are effective as well as their practicality.

Development is the stage where the media is created. It entails numerous phases, such as making the media in accordance with the design, coding, and executing the program. Next, gather flat content for the website from a variety of sources and photographs.

Making of First Products

The front page is the first page you see when you access a website. It includes the domain name, menu options for navigating the site, such as material, formulae for evaluation, about, and logout. Figure 1 shows the front page.



Figure 1. Front page



Figure 2. Material page

This website's material sections include sub materials, concept maps, learning outcomes, broad basic concepts, and basic circumference concepts. Here are some instances of how these resources have been shown.



Figure 3. Basic Concept Roving, and Concept maps

The explanation of the concepts of the circumference and area of a flat object can be seen in Figures 3. A concept map is shown in figure 3 to help students better comprehend how each flat form is related to the others. It is thought that producing content with several images can pique pupils' interest in reading flat shapes.



Picture 6. Sub-matter Menu



Picture 7. Practice Questions

The third page is a submaterial page which contains material on the properties of flat shapes in the form of a video, explanation of the Pythagorean theorem material, examples of problems and their discussion and practice questions (in picture 7).

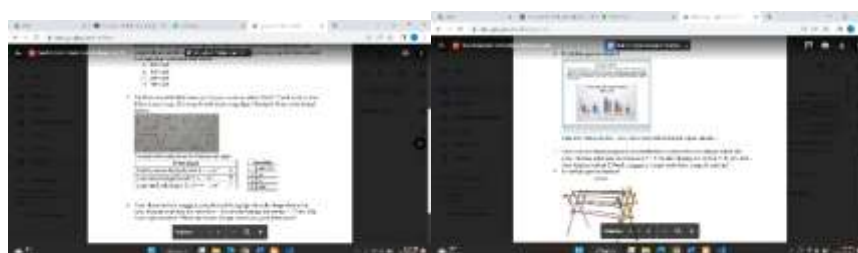
Learning Media Validity

The developed media was then approved by three validators, including media and material experts as well as practitioners who were math teachers. The feasibility of website materials and media as well as the applicability of the created learning media are both evaluated using this validation.

Based on the validator's advice and feedback, the website media was fixed. Improvements to the layout of learning objectives, which are presented before the information on fundamental concepts, are one of the ideas made. Another option is to include questions that initially contain 3 practice questions to a total of 5 questions that cover all the different forms of AKM questions, including multiple choice, matching, description, short answer, and complex multiple choice. Figure 8 depicts the order of the material pages following revision. Figures 9 show the practice questions' before and after pages.



Figure 8. Learning Outcome Sequence



Picture 9. Practice Questions before and after revision

Implementation: The website learning media that has been developed is then tested on VIII class students of junior high schools who take part in the AKM program and consist of 10 students. This stage is testing the effectiveness of website learning media, carried out by giving pretest and posttest offline by visiting schools. First students are asked to work on pretest questions then given website learning media for learning, then students are asked to work on the posttest. The results of the

pretest and posttest will be used to measure the effectiveness of the website learning media that has been developed.

Evaluation (Evaluation), the evaluation stage is used to examine data regarding the reliability, applicability, and efficacy of online learning medium.

The validity of website learning resources and media has been examined using validation data. Table 4 shows the results of the media validity test, and Table 5 shows the material's validity.

Table 4. Media Validity Test Result

Assesment Aspect	(%)	Category
Visual Quality	95	Very Valid
Audio Quality	85	Valid
Communicativeness (Navigation)	90	Very Valid
Documentation	97	Very Valid
Programming	90	Very Valid

Table 5. Material Validity Test Result

Assesment Aspect	(%)	Category
Material Accuracy	94	Very Valid
Completeness of material	92	Very Valid
Suitability of material	90	Very Valid
Systematization of presentation	95	Very Valid
Instructional redaction	97	Very Valid

The validity test results for the media show a percentage of 91.4%, while the results for the content show a percentage of both 94% (greater than 90%), indicating that it falls into the valid category. From this, it may be inferred that internet media can be considered legitimate in terms of media and content.

The practical test sheet was filled in by two validatorors. The test results can be seen in Table 6.

Table 6. Practicality Test Result

Assesment Aspect	(%)	Category
User-friendliness	89	Praktikal
Compormity with time	97	Very Praktikal
Easily interpretable	90	Praktikal
Has the same equivalence	85	Very Praktikal

With a result average of 90.25% (greater than 90%), the practicality test falls under the very practical classification. so that it is possible to say that the website's media is usable.

Effectiveness test was conducted to determine the success of the website media by comparing learning outcomes before and after using the media. There are several stages including the normality test, homogeneity test and the Paired-Sample T Test. Normality test, useful to determine whether the data is normal or not. Based on the results of the normality test output, a significant value was obtained for the normality test using Kolmogrov-Smirnov and Shapiro-Wilk, and the data was normally distributed because $\text{sig} > 0.05$ while the data was not normally distributed because $\text{sig} < 0.05$. Obtained a significance value of 0.576 which means the sig value > 0.05 , it can be concluded that the data is normal.

The homogeneity test can be used to determine if the sample being utilized is homogeneous or not. Comparing the two variations will demonstrate the uniformity. Based on the results of the homogeneity test, a significance value of 0.740 was found, indicating that the data are homogeneous (sig value > 0.05) and having the same variance. In this study, the difference in mean between the pretest and posttest was determined using the paired-sample T test. The Paired-Sample T Test table's findings show that there is a difference between the pretest and posttest, with a mean difference of -15.5. Additionally, the statistical price $t = -4.122$ with $df = 9$ and Sig (2-tailed) displays the number 0.003 (sig 0.05), and the mean standard deviation value is derived, which illustrates the standard error rate of the average difference of 3.760.

This research conducts online media in the form of a website that is focused on AKM inquiries regarding flat shapess. Testing has been done to establish the reliability, viability, and efficacy of website learning medium. The test results demonstrate the learning media's suitability for usage as a website. Table 10 shows the conclusion that may be drawn from the data analysis results.

	Result
Media Validity	Very Valid
Media Practical	Very Praktis
Media Effectiveness	
Normality Test	Normal
• Homogeneity Test	Homogeneous
• <i>Spired t-test</i>	There is a Difference

Table 7 displays the results of the media and material validity test, which are extremely valid with percentages of 91.4% and 94%, and the practicality of the media demonstrates that it is quite practical with percentages of 90.25 using the percentage of achievement according to Aswardi (2019). Additionally, the effectiveness test results with a normal distribution indicate that the pretest and posttest data spread out in the direction of the diagonal line or that the histogram

graph is in the shape of a bell and does not deviate to the right or left. The results of the pretest and posttest data homogeneity tests tended to be the same. The results of the Spired t-test showed a difference with a score of 0.003 (sig <0.05). This means that there is a significant value between the pretest and posttest. So it can be concluded that learning media is valid, practical and effective for use in learning and the use of website learning media can improve learning outcomes on the subject of flat shapes for AKM questions. This is similar to a previous study by Saputri (2022), which aimed to create flat-sided geometric learning media for websites that were reliable, usable, and efficient. Similar study has been done, specifically by Aditya (2018), who created a website for learning mathematics using circle material that has been shown to be reliable, useful, and capable of inspiring kids to learn. A further study by Septia (2021) provided web content that is particularly useful and applicable for teaching mathematics about flat side shapes. The goal of earlier research (A'yun, 2021) was to create a Website Learning to Build Space media that would be practical and legitimate to use in addition to improving student learning outcomes.

Conclusion

The production of website learning materials is focused on AKM questions on flat form content utilizing the ADDIE development paradigm to create materials that are extremely valid, extremely useful, and extremely efficient. We can draw the conclusion that websites are an effective learning tool. The use of online learning media that has been created to assist mathematical learning activities is intended to be optimized with suggestions to teachers and students. In the future, study should be done to create a website with more information and conversation.

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