

The Development of Interactive Learning Media to Improve Students' Motivation on Trigonometry

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Abstrak

Permasalahan yang ditemukan oleh peneliti adalah kurangnya motivasi siswa dalam belajar matematika. Guru harus berusaha menciptakan inovasi menjadikan pembelajaran yang menyenangkan, yaitu melalui media pembelajaran. Media pembelajaran yang mampu membangkitkan motivasi dan keaktifan siswa yaitu media pembelajaran interaktif berbentuk multimedia dengan *Articulate Storyline*. Tujuan dari penelitian ini adalah mengembangkan dan menganalisis efektivitas penggunaan media pembelajaran interaktif yang dikembangkan menggunakan *Articulate Storyline* ditinjau dari motivasi belajar. Penelitian ini termasuk penelitian pengembangan dengan model 4D dari Thiagarajan. Terdiri tahap pendefinisian, perencanaan, pengembangan dan penyebaran. Penelitian dilaksanakan di MA Assa'adah Jamanis Tasiakmalaya. Teknik pengumpulan data melalui observasi, wawancara, kuesioner, dan tes. Teknik analisis data terdiri dari analisis validitas, analisis kepraktisan dan analisis keefektifan. Hasil penelitian menyatakan bahwa media pembelajaran sangat layak digunakan berdasarkan validasi ahli materi dan ahli media serta respons siswa. Motivasi belajar meningkat dilihat dari sebelum dan sesudah menggunakan media interaktif yang dibuat menggunakan *Articulate Storyline*. Ada peningkatan juga pada hasil belajar siswa berdasarkan dari rata-rata hasil *pre-test* dan *post-test*. Penggunaan media pembelajaran tersebut adalah dapat meningkatkan motivasi belajar siswa dalam mengikuti pembelajaran. Pemanfaatan dan penggunaan media interaktif ini disarankan sebagai sumber belajar atau media pembelajaran yang bisa dikombinasikan dengan model/metode pembelajaran yang bervariasi.

Kata kunci: *Articulate Storyline*, Model 4d, Motivasi Belajar, Trigonometri

Abstract

The problem found by the researchers was the lack of student motivation in learning mathematics. Teachers must try to create innovations to make learning fun, that is, through learning media. Learning media that can create motivation and student activity is interactive learning media in the form of multimedia with *Articulate Storyline*. This study aimed to develop and analyze the effectiveness of using interactive learning media developed using *Articulate Storyline* in the learning motivation view. This research includes development research with a 4D model from Thiagarajan. It consists of define, design, develop, and dissemination stages. The study was conducted at MA Assa'adah Jamanis Tasikmalaya. Data collection techniques are observation, interviews, questionnaires, and tests. Data analysis techniques are validity, practicality, and effectiveness analysis. The study results stated that the learning media was feasible based on the validation of material experts and media experts and student responses. Learning motivation increased seen from before and after using interactive media created using *Articulate Storyline*. There is also an increase in student learning outcomes based on the average pre-test and post-test results. The use of these learning media can increase students' learning motivation to participate in learning. Interactive media are

recommended as a learning resource or learning media that can be combined with varied learning models/methods.

Keywords: *Articulate Storyline, 4D Model, Student Motivation, Trigonometry.*

Received: December 17, 2021/ Accepted: July 19, 2022/ Published Online: July 31, 2022



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INTRODUCTION

Mathematics is a subject that is always taught at all levels of education. However, some students consider mathematics a complex and tedious issue (Permatasari et al., [2016](#)). Trigonometry is one of the materials in mathematics. Most students think trigonometry to be a material that is regarded as problematic. That is because trigonometry is an abstract material and has its level of difficulty (Nurcikawati et al., [2018](#)). Trigonometry is the most material studied in the content standards in the 2013 Curriculum. This material is also a prerequisite for studying limits, integrals, three dimensions, and geometric and differential transformations (Sastrawati & Novallyan, [2017](#)).

The researcher's first problem was the lack of motivation to study mathematics. Therefore, teachers must try to create innovations and make learning creative and fun by using various learning media. Thus, students become motivated and enthusiastic about learning. Motivation is an essential aspect of students in learning. Without motivation, students look lazy to participate (Istiningsih et al., [2018](#)).

Based on the preliminary study results, the researchers found that students' learning motivation at MA Assa'adah was low. This research is evident from the presence of students who seem less enthusiastic during math lessons, especially in the afternoon. This thing is because the process of learning mathematics is still a classic model, using only textbooks and whiteboards without any other media that can increase students' learning motivation. This thing makes students feel bored and also bored when taking math lessons. Many students' grades in mathematics do not exceed the KKM determined by the madrasa/school, which is 70.

There are various ways to increase student learning outcomes, one of which is by increasing student learning motivation (Syardiansah, [2016](#)). Students who lack motivation affect student activity in the teaching and learning process (Saepuloh & Ni'mah, [2021](#)), so

students are less enthusiastic about participating in learning mathematics. If students have high motivation, they take part in learning activities seriously and enthusiastically. On the contrary, students with low motivation in learning, students will be lazy to follow the lesson. They do not even want to do math assignments. Students' psychological factors can be seen in several aspects, namely curiosity, self-confidence, and student learning motivation (Wijayanti & Retnawati, [2018](#)).

Furthermore, Sardiman in Syardiansah ([2016](#)) states that motivation allows students to be active in learning activities. Therefore, it is necessary to have a learning media which can / can generate motivation and student activity using interactive learning media. This situation needs to be developed so teachers can use learning media that support innovative and exciting multimedia. Learning media is an effort to increase learning motivation for students to take part in learning.

The word media is a plural form of the Latin word medium, meaning middle ground, introduction, or intermediary (Kustandi & Darmawan, [2020](#)). Media is anything that can convey information or messages from the source to the recipient (Arsyad, [2017](#)). Media can also be interpreted as a tool that can be used in transmitting messages. This message or information is meant to achieve learning objectives (Wati, [2016](#)).

According to Kustandi and Darmawan ([2020](#)), learning media are tools or media that can help teachers in teaching and learning activities that can forward messages and meanings that are clearer so that learning objectives are delivered properly and perfectly. So, learning media can give messages or information and stimulate students' thoughts, concerns, feelings, and enthusiasm. Thus, this encourages teaching and learning activities to be conscious, controlled and purposeful (Setiawan et al., [2020](#)).

Recently, technological development has affected the use of computers grow, including in the field of education (Istiqlal, [2017](#)). Computers as learning media are also called multimedia. Multimedia is a complex media that combine several objects such as text, images, animations, graphics, and videos into an attractive display (Andrizal & Arif, [2017](#); Kusmanagara et al., [2018](#); Yasin & Ducha, [2017](#)). Using multimedia learning media is one of the alternatives under the outstanding teaching and learning process objectives. Utilizing this learning media is expected to increase motivation, clarify the subject matter, and have more varied methods. In addition, students will do more learning activities, not just listen to the teacher.

Teachers must be able to create situations that can provide a stimulus to students to be active in learning. From these problems, researchers have the idea to develop interactive

multimedia-based learning media using Articulate Storyline in trigonometry material. This interactive learning media makes students not pay attention to presentations or objects but can be directed to interact during lessons. The learning media can be created with the assumption that the process of communication and interaction in learning activities can be more meaningful. This interactive learning media makes students not only pay attention to presentations or objects but can be directed to interact during lessons.

An articulate Storyline is a software developed by Articulate Global, Inc. to create great interactive learning, training content, and slide-based presentations. (David et al., [n.d.](#)). The preparation of media using the Articulate Storyline application is very interesting if it is used to create interactive learning media (Yasin & Ducha, [2017](#)). With html5 support, it is easy to publish content that can run across any platform, including online (web-based application), desktop and mobile (David et al., [n.d.](#)). In addition to text, users can add files to the slide, such as adding images, audio, and video quickly. This Articulate Storyline is unique in that it has facilities for adding a name and test variables so that when combined, it can make it easier for teachers to see the terms of students who appear on the screen while evaluating.

Previous research by Utama & Mashfuhah ([2016](#)) stated that the application of using interactive learning media with multimedia could improve student learning outcomes. Then Pratama ([2018](#)) suggested that the media developed with Articulate Storyline as a learning medium could overcome students' difficulties. Another study by Leztiyani ([2021](#)) stated that Articulate Storyline is a tool or media in interactive teaching and can build students' enthusiasm in the teaching and learning process because it has a realistic appearance and accessibility supported by facilities that keep learning to be more enjoyable.

From these problems, the researcher has the idea to develop interactive learning media with an Articulate Storyline on trigonometry material with the research title "The Development of Interactive Learning Media to Improve Students' Motivation on Trigonometry ". It is hoped that developing this learning media can create valid, effective, practical and exciting learning media and increase students' motivation to understand trigonometry material. In addition, it is also expected to impact improving student learning outcomes.

The development of this media is expected to improve the ability of teachers to use technology and media in teaching. Learning media can also be used as learning aids to foster motivation and enthusiasm for learning. In addition, it can provide a learning experience with learning methods that help students to be active in education. Empowering technology can lead to cost and time efficiency, transparency and flexibility. In addition, through this

multimedia-based learning media, the process of communication and interaction in learning will be more meaningful. Students can also participate in the learning process actively and independently.

The objectives of this research are (1) Developing interactive learning media using Articulate Storyline on Trigonometry material in the learning motivation view and (2) Verifying the effectiveness of using interactive learning media developed using Articulate Storyline applications to understand trigonometry in the learning motivation view.

RESEARCH METHOD

This research uses development research, known as research and development (RND). RND is the research carried out in developing or producing a particular product, in this case, creating learning media and testing the product's effectiveness (Sugiyono, [2017](#)). The research uses the Thiagarajan model as known as the 4D model or Four-D Model. This model has four stages: define, design, develop and disseminate (Thiagarajan et al., [1974](#)). The development procedures used in the 4D method are: (1) The initial stage is Define; This stage includes the requisite analysis stage, which consists of five main points: front-end analysis, learner analysis, concept/material analysis, task analysis and specifying instructional objectives. (2) The second stage is Desain; it consists of four main steps: constructing a criterion-referenced test, selecting learning media, format, initial design and preparing benchmark reference tests. (3) The third stage is development; the initial product has been produced at this stage. This stage consists of two steps: (a) expert appraisal or expert assessment accompanied by revisions and (b) developmental testing or development trials. (4) The last stage is the Dissemination stage (disseminate). The deployment stage is to distribute the developed product fixed to be accepted by users (Thiagarajan et al., [1974](#)).

The research was conducted at MA Assa'adah Cihambirung Karangsembung Jamanis Tasikmalaya. The product testing is carried out at the MA Assa'adah Language Laboratory because this laboratory has adequate facilities, has 32 computers, this is quite a lot and supports multimedia. The class taken is X IPA 1 MA Assa'adah with 32 students. Samples were selected randomly. However, due to the pandemic, the model is limited to 50%, 16 students. Techniques for data collection used in this study are interviews, observations, questionnaires (questionnaires) and tests (pre-test and post-test). The instruments used include observation sheets, interview sheets, validation instruments (validation questionnaires from media experts and material experts and student responses) and test questions. The data analysis consisted of content, technical, and instructional quality analysis. Criteria for the

value of the validator using a Likert scale with five intervals. Validity analysis is carried out by collecting data on the validity of the learning media from each validator and then determining the average value of the total validation results of the validators. After that, the calculation is carried out to obtain the Percentage of eligibility using the formula:

$$K = \frac{F}{N \times I \times R} \times 100\%$$

With Description:

K = Percentage of eligibility criteria

F = The total Number of respondents' answers

N = The highest score on the questionnaire

I = Number of questions in the questionnaire

R = Number of respondents

(Riduan, [2016](#))

After the Percentage of eligibility obtained for the quality of content and objectives as well as technical quality, then interpreted based on [Table 1](#). Learning media can be suitable for use if the Percentage of aspects in the questionnaire is 61%_with decent or very feasible criteria.

Table 1. Assessment Interpretation Criteria from Validator

Percentage	Criteria
0 % - 20 %	Very inappropriate
21 % - 40 %	Less Eligible
41 % - 60 %	Enough
61 % - 80 %	Eligible
81 % - 100 %	Very Eligible

(Riduan, [2016](#))

The next step is to analyze the instructional quality, recap the questionnaire data on student responses as users of learning media, then determine the average value of the total user/student response results and convert the average value into a percentage matched with [Table 2](#).

Table 2. Percentage Category of User Response Questionnaire

Percentage	Criteria
0 % - 20 %	Not very good
21 % - 40 %	Poor
41 % - 60 %	Enough
61 % - 80 %	Good
81 % - 100 %	Very Good

(Riduan, [2016](#))

Next is the effectiveness test. The first time that the researchers conducted was a normality test. The data is expected if the significance value is more than 0.05 or $p > 0.05$ (Karson, [1968](#)). Furthermore, the statistical analysis uses a parametric statistical model, the paired sample t-test (Sugiyono, [2017](#)). The calculation of the normality test and statistical analysis was done with SPSS.

RESULT AND DISCUSSION

This research produces a product in the form of interactive learning media for Trigonometry, which is made with the help of the Articulate Storyline application in student motivation. The following is the presentation of the results of the development of the learning media:

Definition Stage (Define)

At the definition stage, the researcher carried out several analyses, such as:

- (1) *Front-End Analysis*; This stage is carried out before starting the research. The researcher chose MA Assa'adah Jamanis as a research place, namely, with the following conditions:
 - (a) The students of MA Assa'adah consist of 40% living in pesantren and 60% from home. They are not allowed to bring gadgets/devices to school. Although they can use devices at home, students who live in Islamic boarding schools cannot because they are allowed to bring devices to boarding schools.
 - (b) MA Assa'adah has Language and Computer laboratory. Each of them has 32 units of computers.
- (2) *Learner Analysis*; This stage conducts observations and interviews. The observations showed that students were less enthusiastic in mathematics lessons because teachers taught only using textbooks. So we need supporting media that will make learning more attractive, such as media that can show more pictures, videos and exciting learning assessments/evaluations. The core is to increase student motivation in learning. Students' academic abilities vary widely with various learning styles and speeds. In this case, some students learn by reading text, listening to audio or watching videos. The rate also varies. Some students must not be able to understand trigonometry material in one lesson.
- (3) *Material analysis*: This study's material is class X trigonometry. The material/concept analysis includes analysis of KD 3.7, 3.8, 3.9 and 3.10 for the knowledge aspect and KD 4.7, 4.8, 4.9 and 4.10 for the skill aspect.

- (4) Task analysis; At this stage, activities are carried out by providing the material that can be read, listened to and listened to through videos or tutorials directly on interactive media related to trigonometry.
- (5) Specifying instructional objectives, which are the results of the analysis at the material analysis stage, become more specific goals in learning.

Design Stage

The stages of design are divided into:

- (1) Media selection; Based on the results of the initial analysis, the condition of the equipment that can be used at MA Assa'adah is the computer in the language lab and the computer lab. In this study, the language lab was used as a tool for testing. The development is focused on computer-based interactive media because students are not allowed to bring smartphones to the madrasa. Learning media is presented offline due to bandwidth limitations. This media was compiled with the help of the Articulate Storyline application. The reason is that the application can create web-based or interactive CD-based applications without understanding coding. Furthermore, the result does not need the internet and only distributes the files to each computer.
- (2) Format selection; the researchers focused on developing learning media for mathematics subjects at this stage. This stage includes making flowcharts and storyboards. Flowcharts are used to help design learning media, and storyboards symbolise the milestones for the expansion of the flowchart in [Figure 1](#).

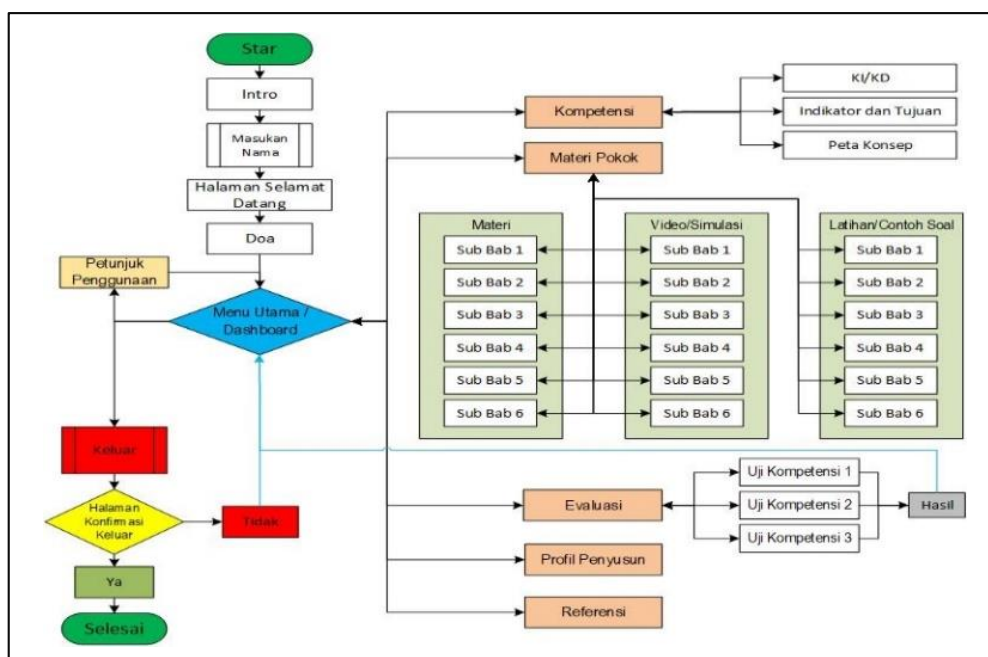


Figure 1. Flowchart of Interactive Media on Trigonometry

- (3) The initial design is the design of learning media with an Articulate Storyline which is adapted to the material that has been analyzed. The product in this stage is a prototype of interactive learning media, as shown in [Figures 2, 3, and 4.5](#).



Figure 2. Welcome Page



Figure 3. Main Menu Page



Figure 4. Material Page

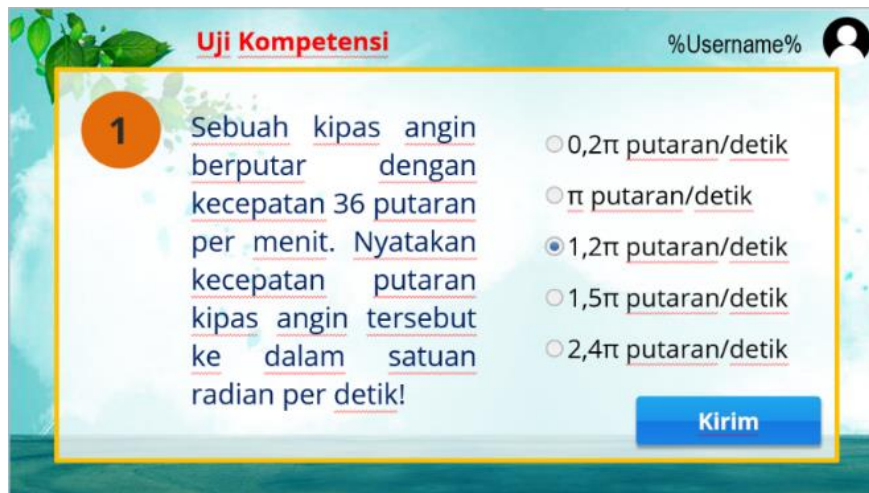


Figure 5. Evaluation Page

Development Stage (Develop)

This stage consists of two stages, namely:

- (1) Expert Appraisal; This stage is a validation technique for assessing the feasibility of interactive media designed by researchers. This validation is to determine the feasibility of the content quality and purpose. This technique is divided into material expert validation and also media expert validation. Determination of the feasibility of the product material is measured based on the assessment results of two material validators, namely the lecturer of the Department of Mathematics Education, Siliwangi University, Dr Khomsatun Nimah, M.Pd and a certified Mathematics teacher at MA Assa'adah, Ai Yati, S.Pd. Determining the criteria for the feasibility of the product media was based on the assessment of two media experts, namely the lecturers of STT YBSI Tasikmalaya, Siti Maesaroh, S.T., M.Kom. and Informatics Teacher MA Assa'adah certified educator, Ratih Nurhaidah, SP. From the questionnaire, the quality of the content and the purpose of the developed product obtained a presentation of 88%, with the criteria "Very Eligible". The results of material expert validation for each aspect can be seen in [Table 3](#).

Table 3. Validation Results from Material Experts

Indicator	Percentage	Category
Accuracy	90%	Very Eligible
Interest	90%	Very Eligible
Completeness	85%	Very Eligible
Balance	88%	Very Eligible
Interest/Attention	80%	Very Eligible
Fairness	100%	Very Eligible
Conformity to the student's situation	95%	Very Eligible

The validation results by the expert material validator show that the indicators assessed on the quality of the content and objectives above are Very Appropriate. Based on the results of the material expert's validation, it can be concluded that the feasibility of interactive learning media made with Articulate Storyline shows that the criteria are very Eligible to use.



Furthermore, media validation is carried out by lecturers and informatics teachers regarding technical quality. From the technical quality questionnaire developed, it obtained a presentation of 87.50% with the "Very Eligible" criteria. Meanwhile, the media validation results for each aspect can be seen in [Table 4](#).

Table 4. Media Expert Validation Results

Indicator	Percentage	Category
Readability	88%	Very Eligible
Easy to Use	95%	Very Eligible
Display Quality	87%	Very Eligible
Answer handling quality	80%	Very Eligible
Quality of program management	85%	Very Eligible
Documentation quality	90%	Very Eligible

The validation results from the media expert validator's assessment show that the indicators assessed on the technical quality are "Very Eligible". Based on the results of media expert validation, it can be concluded that this interactive learning media is eligible to use in [Table 5](#).

Table 5. Revisions and Improvements

Validator Suggestion	Product at Beginning	Product after revision
The background color, color and icon color are inconsistent	The background color and icon shape vary	The background and icon colors are made consistent even with different themes.
The sound icon should be combined on./off.		
The introduction page should be replaced.	The introduction page is too much and too long.	The introduction page on the initial display of the learning media is deleted.
The sound of the music must be removed.	According to media experts, the availability of music can make learning ineffective because it can interfere with the teacher's voice when strengthening the material.	There is an audio/sound on/off icon placement.
the profile page with the name of the developer should be replaced	On the learning media home page, there is a profile button which, if selected/clicked, will enter the profile page. This profile page	The availability of the profile button is not effective, so it needs to be removed. Instead, the developer's name is written

Validator Suggestion	Product at Beginning	Product after revision
	contains profiles of developers, supervisors, media experts, and material experts.	on the learning media page.

(2) Developmental Testing; This stage is in the form of testing the media in the intended environment. The things that are tested first are prerequisite software, resolution, and compatibility. Application testing is carried out on the language lab client computer, as shown in [Figure 6](#).



Figure 6. Media that has been distributed to Student PCs

The learning media developed obtained student responses with a score of 85.21%. If seen from the table of Percentage of student responses, the value obtained is in the interval of 81% - 100% indicating the "Very Good" criteria. So, learning media can be said to be very practical. The results of material validation for each aspect can be seen in [Table 6](#).

Table 6. Student Responses on Each Aspect

Indicator	Maximum Score	Score Gain	Percentage	Criteria
Provides learning opportunities	320	274	86%	Very Good
Provide learning assistance and motivation	160	133	83%	Very Good
Instructional Flexibility	400	342	86%	Very Good
The quality of the tests and ratings	240	202	84%	Very Good
Impact on students	320	276	86%	Very Good

Based on the post-test results, 1 out of 16 students could not reach the KKM. However, in terms of the Percentage of classical completeness, it shows that the mastery of class X IPA A 1 students is 94%, greater than 75%. Thus, the learning media that developed can be declared effective. Furthermore, the results of the analysis of learning effectiveness can also be seen based on the calculations using SPSS, as shown in [Table 7](#).

Table 7. Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre_test	42,44	16	10,973	2,743
	Post_test	78,56	16	6,164	1,541

The Summary of SPSS statistical results is from each sample, namely the pre-test and post-test scores. The pre-test score obtained an average (Mean) of 42.44. The post-test score received an average of 78.56. Because the pre-test score is $42.44 < \text{post-test } 78.56$, there is a difference in the average learning outcomes in the pre-test with the learning outcomes in the post-test. Whether the difference is significant or not, the paired sample t-test is shown in [Table 8](#).

Table 8. Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	Pre_test & Post_test	16	0,803	0,000

The output above shows the correlation test results between the two data, the pre-test and post-test results. Based on the production, the correlation coefficient (Correlation) value is 0.803. It means a solid and positive relationship. The significance value_ (Sig.) that appears is 0.000 because the significance value is smaller than 0.05 ($0.00 < 0.05$), it can be concluded that the pre-test and post-test experienced significant changes, as shown in [Table 9](#).

Table 9. Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Pre_test - Post test	-36,125	7,051	1,763	-39,882	-32,368	-20,494	15	0,000

Based on the output table above, it is obtained that the t_{count} has a negative value of -20,494. This negative value is because the average value of learning outcomes in the pre-test is lower than the average post-test value. The negative t_{count} value still has a positive meaning, so the t_{count} becomes 20.494. Then determine the value of t_{table} , where t_{table} can be searched from the value of df (degree of freedom) or degrees of freedom with a significance value $\frac{\alpha}{2}$. Table 9 shows that the df value is 15, and the significance is $\frac{0,05}{2} = 0.025$. This value determines the t_{table} value in the statistical t_{table} value distribution table. Then the value of the t_{table} is 2.131. Thus, with the value of $t_{\text{count}} = 20,494 > t_{\text{table}} = 2,131$, it can be concluded that

there is a significant average difference between the pre-test and post-test. It means that there is an effect of using interactive media that was developed using Articulate Storyline in improving student learning outcomes in Mathematics for Trigonometry.

Stage of Dissemination

The last stage is the dissemination stage (disseminate). This stage is carried out to distribute the product (media) developed so that it can be accepted by users (teachers and students) by individuals and groups. This dissemination stage was carried out at the school/madrasa where the trial was conducted, namely at MA Assa'adah Jamanis, Tasikmalaya Regency, by providing interactive media files, CDs and guides to mathematics subject teachers.

DISCUSSION

The results of interviews with mathematics teachers found that the teacher had never used any interactive media in learning mathematics because there were no available learning media about trigonometry provided in libraries or on the internet, which were the open source or free. According to subject teachers, this learning media is helpful because the teacher is assisted in guiding students one by one more optimally. The teacher also recommended this interactive learning media because it can foster student motivation. He also cannot if he has to make it himself.

From the interviews with four students, three students stated that students had never used interactive learning media developed in mathematics. One person sometimes answered when at home. The impression of students in use interactive learning media is that they have the motivation to learn mathematics. Do not feel bored in learning mathematics because there are differences from previous learning, which is only the classical method. Students feel happy because the interactivity of this interactive learning media is easy. This media contains explicit trigonometry material. Students can repeat material that has not been understood.

Based on initial observations, it was found that learning activities for mathematics subjects were still more teacher-centered. Learning also emphasizes completing the material with the classical model, namely the implementation of the conventional learning model where only the teacher explains, and the students are only listeners (Hidayati, [2017](#)). Thus, it does not provide flexibility for students to learn independently and actively. Students are less active, get bored quickly and daydream (not focused) when the teacher delivers the material. Students still have many difficulties in concepts and trigonometric material calculations, causing low student learning outcomes.

Based on student questionnaires on the aspects of interest and attention, it shows that 80% is very feasible. Based on student questionnaires, it can also be shown that providing assistance and learning motivation is 83% or very good and there are also 86% that can have a good impact on students. So, one of the uses of learning media is to increase learning motivation for students to take part in learning. This learning media can facilitate and improve student learning motivation. This media is also necessary, given the increasingly rapid technological advances at this time. By using interactive learning, media has to do with student motivation. Students are more focused and can increase enthusiasm for learning. Arsyad (2017) mentions that using interactive learning media in learning can generate student motivation and interest. Motivation and learning are things that influence each other. Every child is motivated to learn (Istiningsih et al., 2018).

Based on the test results, it can be seen that from the effectiveness of learning media, there is an increase in students' learning motivation before and after using interactive learning media. The analysis of improving learning outcomes also shows a boost before and after using interactive learning media, from 6% to 94%. This result indicates that the developed interactive learning media can be effective.

Besides cognitive aspects, teachers should also pay attention to problems from affective elements in the learning process. Some students have issues from the affective part, one of which is the lack of learning motivation. Learning motivation is one of the non-intellectual psychological factors which can support the success of learning activities, including learning activities in mathematics (Sardiman in Istiningsih et al., 2018). Lack of student learning motivation also affects student activity in the learning process. Psychological factors of students can also be seen in the motivation to learn, curiosity and self-confidence (Wijayanti & Retnawati, 2018). This learning media can facilitate and increase student learning potential.

This learning media is made using an Articulate Storyline. This learning media represents a complete and exciting object because it presents text, audio or video. Examples of questions, exercises and evaluations do not make it difficult for students to deal with the media. The choice of colors also does not make students even dizzy. In addition, this medium is also easy to use. They are generating student interest with this interactive learning media. In addition, the motivation to learn mathematics is also seen.

It is important to note that although the presence of technology can be a medium and source of learning, it cannot replace the role of the teacher. When students are confused and stuck, the teacher immediately acts proactively and guides students without other students not

learning because of the availability of material explanations in interactive learning media. As in [Figure 7](#) and [Figure 8](#).



Figure 7. Student Situation in the Learning Process with Interactive Learning Media



Figure 8. Teachers can guide students intensely

Shalikhah (2017) states that interactive multimedia learning can make the learning process more exciting and easier to understand the material. This condition is so that learning conditions that were initially stressful turn into fun. So those students are motivated. Interactive learning media or multimedia can assist teachers in creating interactive learning patterns. This media is done by combining and presenting various types of objects in one learning, namely multimedia-based learning media, so that the material can be digested by all students with multiple learning styles such as visual, audio, and kinesthetic.

CONCLUSION

Based on the results and discussion, it can be concluded that: 1) the product in this study is an interactive learning media for trigonometry made using the Articulate Storyline. This research development model uses Thiagarajan's 4D (Four-D) model, which consists of four stages, namely the first is “define”, the second is “design”, the third is “develop”, and the fourth “dissemination”. Learning media is classified as very practical because it has been validated by material experts and media experts. Learning motivation also increased after using interactive media made with Articulate Storyline; 2) There was an increase in student learning outcomes based on the average pre-test and post-test scores. Then, the value of $t_{\text{count}} 20,494 > t_{\text{table}} 2,131$, there is a significant average difference between the results of the Pre-Test and Post-Test learning, which means that there is an effect of using interactive media developed using Articulate Storyline in improving learning outcomes of Mathematics on Trigonometry.

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