

DEVELOPING BLENDED LEARNING MODEL USING SCHOOLGY-BASED FLIPPED CLASSROOM ROTATION FOR PRACTICING SELF-REGULATED LEARNING ABILITY

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Received 29 December 2021; Received in revised form 15 March 2022; Accepted 23 March 2022

Abstract

This research is aimed to develop lesson plan (RPP) with a blended learning model in rotation of flipped classrooms and teaching materials packed into schoology to practice self-regulated learning skills in a valid and practical application. The form of the lesson plan integrates self-regulated learning aspects into learning activities to practice the students' self-regulated learning skills. The learning material is arranged into two types: interesting reading books in PDF and animated PPT (Ms.PowerPoint) slides. The whole of the materials, discussions, and exercises are included in schoology. The topics discussed in this research are sine and cosine rules. The research applies the 4D (Define, Design, Develop, Disseminate) model of research and development. The subjects of the research are 38 students of X Science 5 of MAN 2 Gresik. The data of the research is collected by field-note and validation sheets, then analyzed with the field-note data analysis techniques, validity, and practicality of the learning media. The result of the research shows that the developed lesson plan is reached the eligibility standard based on the validity and practicality of the learning media. The validity score of the lesson plan is 4,52 on average with the highly valid category, and the validity score of learning materials in schoology is 4,48 with the highly valid category. The experts stated that the lesson plans and teaching materials in schoology that were developed were feasible with an average value of "A" which means that the learning tools developed are practical and can be applied without revision.

Keywords: Blended Learning; Flipped Classroom; Schoology; Self-Regulated Learning.

Abstrak

Penelitian ini bertujuan untuk mengembangkan RPP model pembelajaran blended learning dengan rotasi flipped classroom dan bahan ajar yang dikemas dalam schoology guna melatih kemampuan self-regulated learning yang valid dan praktis digunakan. RPP disusun dengan mengintegrasikan aspek-aspek self-regulated learning dalam kegiatan pembelajaran agar dapat melatih kemampuan self-regulated learning siswa. Bahan ajar disusun dalam dua bentuk yaitu buku bacaan menarik berupa PDF dan animasi PPT. Seluruh materi pada bahan ajar, diskusi, dan latihan soal dimuat di dalam media schoology. Materi yang digunakan dalam perangkat pembelajaran adalah aturan sinus dan cosinus. Metode penelitian yang digunakan dalam penelitian ini adalah penelitian pengembangan dengan model pengembangan 4D (Define, Design, Develop, Disseminate). Subjek penelitian ini adalah siswa kelas X IPA 5 MAN 2 Gresik berjumlah 38 siswa. Instrumen pengumpulan data pada penelitian ini adalah lembar field note (catatan lapangan) dan lembar validasi. Data penelitian ini kemudian dianalisis menggunakan teknik analisis data field note, kevalidan perangkat pembelajaran, dan kepraktisan perangkat pembelajaran. Hasil dari penelitian ini menunjukkan bahwa perangkat pembelajaran yang dikembangkan memenuhi standar kelayakan. Hal ini berdasarkan hasil kevalidan dan kepraktisan perangkat pembelajaran yang dikembangkan. Hasil kevalidan RPP diperoleh rata-rata 4,52 dengan kriteria sangat valid, dan hasil kevalidan bahan ajar dalam schoology diperoleh rata-rata 4,48 dengan kriteria sangat valid. Para ahli menyatakan bahwa RPP dan bahan ajar dalam schoology yang dikembangkan layak untuk digunakan dengan rata-rata nilai "A" yang artinya perangkat pembelajaran yang dikembangkan praktis dan dapat digunakan tanpa revisi.

Kata kunci: Blended Learning; Flipped Classroom; Schoology; Self-Regulated Learning.



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DOI: <https://doi.org/10.24127/ajpm.v11i1.4660>

INTRODUCTION

Learning is one of the keys that determine students' success. Without the presence of students' active roles in the learning process, it will be difficult for success to be achieved. Students' learning success can be achieved once they maximize their ability in regulating learning patterns and arranging learning plans. The chance in regulating the whole learning process is called 'self-regulated learning.

Self-regulated learning is students' ability in managing metacognitive, motivational, and behavioral aspects in terms of achieving their learning goals. In the metacognitive aspect, students can create a plan and manage their thinking process. In the motivation aspect, students have a strong belief that they are competent learners. In behavioral aspects, students are good at managing and utilizing their learning environment. All of the aforementioned aspects have a significant influence on the students' mathematic learning achievements (Kusaeri & Mulhamah, 2016). Self-regulated learning is very influential in determining students' learning success. In addition to influencing learning achievement, self-regulated learning also affects problem-solving abilities, mathematical connection abilities (Hudaifah, 2020). Self-regulated learning also greatly influences students' learning culture. If self-regulated learning skills are continuously practiced, students will get used to being independent in learning (Febriyanti & Imami, 2021). Based on attitude assessment in the learning process, students of X Science 5 in MAN 2 Gresik self-regulated learning ability are considered still lacking.

Improved ability of self-regulated learning can be achieved if the learning

process can stimulate students in applying aspects of self-regulated learning. One way to practice self-regulated learning skills is to arrange learning activities that can help students optimize their self-regulated learning abilities. One of the activities that support the optimization of self-regulated learning abilities is applying the blended learning model.

Blended learning is a learning model that combines face-to-face learning and online learning. This learning model provides opportunities for students to learn actively with self-regulation, self-control, self-motivation, and developing self-confidence, as well as choosing or managing their learning environment to support the effectiveness of their learning (Sucipto, 2017). Applying blended learning is also effective in increasing student learning independence (Febriani, 2021). This is because students who take part in blended learning tend to have high independence, learn better, and always try to show the best results (Tsaniyah et al., 2019). In addition, students who apply the blended learning model have high self-regulated learning abilities (Kamarni & Rahadian, 2021).

The flipped classroom is a blended learning rotation that requires students to study online material provided by the teacher. The material can be accessed outside of school hours and the reinforcement of the material is face-to-face with the teacher at the school. An example of a school that implements a flipped classroom is Stillwater Area Public Schools, United States. The concept used by the school is that students learn materials outside of school hours through gadgets connected to the internet, then at school. students and teachers practice and strengthen the materials that have been

DOI: <https://doi.org/10.24127/ajpm.v11i1.4660>

studied by students individually. This learning concept allows students to learn effectively and efficiently, more easily access materials, and can increase motivation and learning independence (Hastuti, 2020). The application of blended learning using flipped classroom rotation requires learning media that can support online learning activities. If implemented in mathematics learning, it requires media that can facilitate various online mathematical activities. One of the media that can facilitate it is LMS (Learning Management System) schoology.

Schoology is one of the software supporting the learning process that provides online learning services with an attractive appearance because it has features such as social networks that are equipped with images, videos, documents, symbols, equations, and latex making it easier to create materials, quizzes, exams, and assignments. in learning mathematics. The use of schoology in the learning process can make a greater contribution to improving self-regulated learning abilities (Purba et al., 2019). In addition, the application of blended learning assisted by schoology can increase student activity and learning achievement (Purwitasari et al., 2019). Students who utilize blended learning using schoology tend to learn better, are capable to monitor, evaluate and manage their learning effectively, and are competitive in terms of showing the best result (Tsaniyah et al., 2019).

Based on the results of interviews with Mathematics teachers at MAN 2 Gresik show that most mathematics teachers at MAN 2 Gresik used the lecture method in their lesson plans. The teaching materials used for teaching are only textbooks and

enrichment module books. While reviewed based on students' perspectives, students' self-regulated learning abilities are still lacking. Students tend to be less independent and responsible for the assignments given. Based on the observation sheet on attitude assessment in learning, when working in groups only 15.79% of students were dominant, 65.79% of students waited for other students' instructions, and 18.42% of students did not participate in the work. When given individual assignments, only 7.89% of students did them fairly and independently, and 92.11% of students asked their friends for answers because they were not confident with their own answers. Interest in learning mathematics low and have an impact on difficulties in understanding mathematics, one of which is in learning trigonometry material. Students' difficulties in trigonometry material are caused because students do not understand the trigonometric concepts of sine, cosine, and tangent (Fajri & Nida, 2019).

Understanding these problems, it is necessary to develop a lesson plan based on blended learning with flipped classroom rotation and teaching materials for the sine and cosine rules contained in schoology. The lesson plans and teaching materials contained in schoology will be integrated with aspects of self-regulated learning, so that they can practice students' self-regulated learning abilities. In several existing studies, there has been no development of blended learning model lesson plans with flipped classroom rotation and teaching materials in schoology to practice self-regulated learning skills in trigonometry material.

This study aims to develop a lesson plan based on blended learning

DOI: <https://doi.org/10.24127/ajpm.v11i1.4660>

with flipped classroom rotation and teaching materials in schoology to practice self-regulated learning skills that are valid and practical to use.

RESEARCH METHOD

This study is a research and development. The resulting product is a learning media in the form of lesson plans and teaching materials. The lesson plans were developed using a blended learning model with a flipped classroom rotation, students have studied independently online at home before carrying out face-to-face learning in class, on the sine and cosine rule material. All activities and components in the lesson plan are also integrated into aspects of self-regulated learning. Meanwhile, teaching materials are presented in two forms, namely interesting reading books in PDF format and PPT animation. Teaching materials contain material, sample questions, and discussions, as well as exercises. To make it easier for students to understand the related material, teaching materials are packaged in interactive schoology media that allows students to access it anywhere and anytime. In addition, students and teachers also have broad opportunities to discuss in schoology.

The resulting product was tested on 38 students of class X Science 5 MAN 2 Gresik. This study uses a 4D development model (Define, Design, Develop, Disseminate) with 4 stages, namely define, design, develop and disseminate. The complete research flow is presented in figure 1.

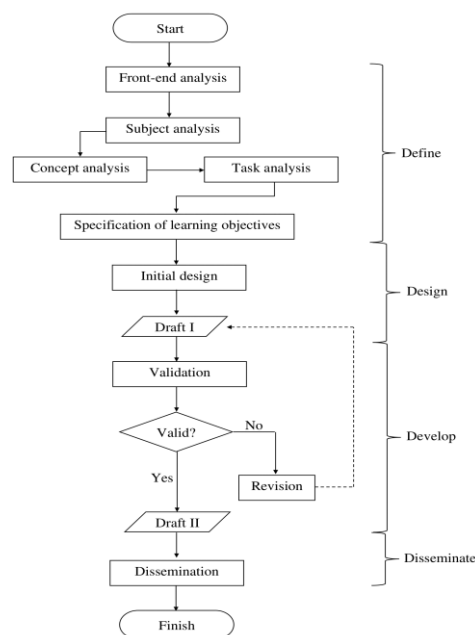


Figure 1. Research Procedure

The instruments in this study include field notes and expert validation sheets. Data collection in this study used field note data collection techniques and expert validation. Validation was carried out by experts and mathematics teachers at MAN 2 Gresik. This technique will produce data on the validity and practicality of the lesson plans and teaching materials developed.

To test the suitability of the lesson plans and appropriate teaching materials, the data obtained need to be analyzed. The analyzes carried out include:

1. Field Note Analysis

The data collected from field note sheets were analyzed qualitatively (Yuliantini et al., 2020). Field note analysis in the form of descriptions. Analysis of field notes in the form of a description. Data analysis was carried out by explaining the entire process of developing lesson plans and teaching materials in schoology.

2. Analysis of the Learning Media Validity

DOI: <https://doi.org/10.24127/ajpm.v11i1.4660>

To determine the validity of lesson plans and teaching materials in Schoology, the following formula can be used:

$$RTV = \frac{\sum_{i=1}^n RA_i}{n} \quad (1)$$

Notes:

RTV: The total average of the validator's assessment results on the lesson plans and teaching materials in the developed schoology

RA_i: The i-th aspect average

n: The number of aspects

Then the average scores of the validator's assessment results are matched with the following validity criteria (Wicaksono et al., 2014).

Table 1. Category for Learning Media Validity

Score Interval	Validity Category
$4 \leq RTV \leq 5$	Highly Valid
$3 \leq RTV < 4$	Valid
$2 \leq RTV < 3$	Less Valid
$1 \leq RTV < 2$	Not Valid

The lesson plans and teaching materials in schoology produced are said to be valid if the average scores of the validator's assessment results are in the valid or highly valid category (Wicaksono et al., 2014).

3. Analysis of the Learning Media Practicality

Lesson plans and teaching materials in schoology are said to be practical in theory based on a qualitative assessment or statement from the validator (Nabilah, 2019). Qualitative statements were obtained from the assessment of lesson plans and teaching materials in schoology provided by the validator. The scores obtained based on the validation results are processed using the formula:

$$N_p = \frac{\text{total of obtained scores}}{\text{total of the highest score}} \times 100 \quad (2)$$

With *N_p*: Practicality scores

On the other hand, the average total of practicality scores was obtained from:

$$RT = \frac{\sum N_p}{\text{the number of validator}} \quad (3)$$

Notes:

RT: The average total of practicality scores

$\sum N_p$: Total of practicality scores

The results of the average total of practicality scores can be categorized in the general statement of the validator as follows:

Table 2. Category for Learning Media Practicality

Category	Score	Description
A	$85 \leq RT \leq 100$	Can be applied without revision
B	$70 \leq RT < 85$	Can be applied with minor revisions
C	$55 \leq RT < 70$	Can be applied with major revisions
D	$RT < 55$	Cannot be applied

Lesson plans and teaching materials in Schoology are categorized as practical if they can be applied with minor or no revision (Sholekah, 2018).

RESULTS AND DISCUSSION

The products that will be developed in this research are blended learning model lesson plans and teaching materials in schoology. The results of the research that has been carried out are as follows:

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1. Define

Through observation, interviews, and surveys, the following data were obtained. At the front-end analysis stage, information was obtained that in terms of the learning media used by teachers, most of the MAN 2 Gresik teachers used conventional learning/lesson plans. In addition, the teaching materials used are limited to textbooks and enrichment model books from schools. Teachers do not use LCD projectors. This shows that the use of technology in learning is less than optimal. Then in terms of student independence, students tend to be less independent and less responsible for the tasks given by the teacher,

At the student analysis stage through a survey to students X Science 5 MAN 2 Gresik, information is obtained that based on the survey results related to internet access and gadgets, 100% of students can access the internet, with details of access speeds of 23,3% smooth, 70% moderate, and 6,7% slow. Students who have cellphones are 100%, while students who have laptops/computers are 26,7%. Then based on the results of a survey related to learning patterns and student learning independence when studying mathematics, 93,3% of students learn mathematics only because there are assignments or exams, with details of the method of learning mathematics independently 93,3%, and 6,7% via tutoring. Furthermore, seen from the factors of students' difficulties in learning mathematics, information was obtained that as many as 86,7% of students had difficulties in learning mathematics. The difficulty factors

include 86,7% not understanding the concept, and 16,7% of the teacher's learning model tends to be monotonous. Learning that can help students understand mathematics includes 63,3% of face-to-face learning, and 36,7% mixed-face and online learning. Then the forms of teaching materials that help students in understanding mathematics include 66,7% of interesting reading books in the form of PDF, 83,3% of animations in PPT, and 56,7% of videos.

At the concept analysis stage, this study took the sine rule and cosine. This material is given to class X students in semester 2. The material for the rules of sine and cosine is a new material for students, but students have understood the material of trigonometric ratios (sine, cosine, tangent, cosecant, secant, and cotangent) in right triangles. This material is the basis for learning the sine and cosine rules. Based on the 2013 curriculum KD 3.9 and 4.9 related to the sine and cosine rules, it can be arranged into several indicators of competency achievement in each KD including:

- 3.9.1 Explaining the concept of the sine rule.
- 3.9.2 Explaining the characteristics of the sine rule.
- 3.9.3 Explaining the concept of the cosine rule.
- 3.9.4 Explaining the characteristics of the cosine rule.
- 4.9.1 Using the concept of the sine rule in solving everyday problems.
- 4.9.2 Using the concept of the cosine rule in solving everyday problems.

At the task analysis stage, students are given rule questions sine

DOI: <https://doi.org/10.24127/ajpm.v11i1.4660>

and cosine in the form of a description of 4 numbers. Questions are given after class so that students are accustomed to understanding concepts and solving problems. In addition, there are 10 number competency test questions in the form of multiple-choice, matchmaking, true or false choices, and descriptions. All questions are contained in schoology.

At the stage of formulating learning objectives, the following learning objectives are formulated, through discussion activities, question and answer, independent study, and individual assignments using schoology, students are expected to be actively involved, work together, confident, independent, and discipline, and students can also explain the concept of the sine and cosine rules, explain the characteristics of the sine and cosine rules, use the concepts of the sine and cosine rules in solving problems.

Based on the results of the analysis at the definition stage, the researchers were encouraged to develop mathematic learning media in the form of blended learning model lesson plans and teaching materials in schoology to practice students' self-regulated learning abilities.

2. Design

At the design stage, learning media will be designed with details of test questions, lesson plans, teaching materials, media, and lesson plans format.

The test questions developed were individual test questions consisting of 10 questions. The form of the question consists of multiple-choice, short entry, matchmaking,

and choosing true or false. This question is a competency test of related material. The number of questions and the answer choices on the questions done by one student with another student are not the same. So the opportunity for students to work together with their friends is very little compared to the general competency test. With the concept of preparing the test, the tests that are arranged are very likely to be able to practice students' independence and practice students' self-regulated learning abilities.

The lesson plans in this study were prepared to refer to the syntax of the schoology-based blended learning rotation flipped classroom learning model. Not to be forgotten, the preparation of the lesson plans is carried out by inserting activities that can practice students' self-regulated learning abilities. The lesson plans are prepared for 3 meetings with the allocation for each meeting being 2×45 minutes. Activities in the lesson plan use flipped classroom rotation by dividing activities into three, namely before class (online activities at home), during class (face-to-face activities in class), after class (online activities at home). In before-class activities, the teacher uploads teaching materials in schoology, and instructs students to study teaching materials before during class activities. During class activities, face-to-face learning is carried out with learning steps according to the blended learning syntax including seeking information, acquiring information, synthesizing knowledge. In after-class activities, the teacher opens a discussion session in schoology, and instructs students to complete the

DOI: <https://doi.org/10.24127/ajpm.v11i1.4660>

practice questions that have been included in schoology. The rotation of the flipped classroom, which is divided into before class, during class, after class which is carried out by learning independently at home is an activity that can practice students' self-regulated learning abilities.

The teaching materials in this study were arranged in two forms, namely interesting reading books in PDF format, and animations in the form of PPT. Each form of teaching materials is also divided into two, namely teaching materials for the sine rule and teaching materials for cosines. The design concept of both materials is the same. The preparation of teaching materials in different forms is done because of the different types of student learning. Some students only read the book enough to understand, while some students also need a step-by-step explanation. PPT format teaching materials are focused on understanding concepts step by step using text and animation. So that students easily understand the concept of the sine and cosine rules. With the existence of teaching materials in these two forms, it can practice students to choose the form of teaching materials that make it easier to understand the concept of the sine and cosine rules. Teaching materials are also studied during the independent study before class at home, so students can practice self-regulated learning skills.

The selected media included whiteboards, markers, LCD projectors, laptops, teaching materials for the sine and cosine rules, and schoology. In this study, schoology was chosen as a blended

learning medium because it facilitates easy learning of mathematics with latex and equation features and supports self-regulated learning skills with features of randomizing question numbers and answer choices, complete question forms, time management, and making it easier for students. independent learning at home because they can discuss with the teacher and between students. The format of the lesson plans is adjusted to the curriculum applied at the MAN 2 Gresik school, namely the 2013 curriculum. While the format of the teaching materials is adjusted to the Directorate of Senior High School Development.

The following is the design of teaching materials in the form of interesting PDF readings on figure 2 until figure 10, PPT animations on figure 11 until figure 17, and schoology on figure 18 to 25.

Teaching materials in the form of engaging reading PDF



Figure 2. User Interface

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Figure 3. Table of Contents

PETUNJUK PENGGUNAAN BUKU

Buku ini berisi materi tentang konsep aturan sinus, dan penyelesaian masalah yang berkaitan dengan aturan sinus. Sebelum mempelajari buku ini, anda sudah harus menguasai materi prasyarat yaitu tentang perbandingan trigonometri pada segitiga.

Buku ini dapat digunakan dalam kegiatan pembelajaran baik dilaksanakan dengan tatap muka, maupun belajar mandiri di rumah secara online.

Setelah mempelajari buku ini, diharapkan mempelajari materi aturan sinus dalam bentuk *power point* (PPT) yang sudah disediakan agar semakin tajam pemahaman konsep anda terkait aturan sinus. Untuk memastikan tingkat penguasaan, anda dapat mengerjakan latihan terkait aturan sinus pada *assignment schoology*.

Apabila anda mengalami kesulitan memahami materi dan mengerjakan tugas karena sarana, prasarana, alat yang diperlukan, maka anda dapat berkonsultasi dengan rekan sejawat atau guru mata pelajaran.

Figure 4. The Book's Manual

KOMPETENSI INTI

KL-3 : Memahami, menerapkan, menganalisis dan mengaitkan pengetahuan faktual, konseptual, prosedural, dan metakognitif berdasarkan rasa ingin tahunya tentang ilmu pengetahuan, teknologi, seni, budaya, dan humaniora dengan wawasan kemasyarakatan, kebangsaan, kenegaraan, dan kesadaran lokal, serta perilaku etis dan keadilan, serta menerapkan pengetahuan prosedural pada bidang kajian yang spesifik sesuai dengan bakat dan minatnya untuk memecahkan masalah.

KL-4 : Mengolah, menalar, menyaji, dan mencipta dalam ranah konkret dan ranah abstrak terkait dengan pengembangan dari yang dipelajarinya di sekolah secara mandiri serta bertindak secara efektif dan kreatif, dan mampu menggunakan metode sesuai kaidah keilmuan.

Figure 5. Core Competences

Kompetensi Dasar	Indikator Pencapaian Kompetensi
3.9 Menjelaskan aturan sinus dan cosinus	3.9.1 Menjelaskan konsep aturan sinus
	3.9.2 Menjelaskan ciri-ciri aturan sinus
	3.9.3 Menjelaskan konsep aturan cosinus
	3.9.4 Menjelaskan ciri-ciri aturan cosinus
4.9 Menyelesaikan masalah yang berkaitan dengan aturan sinus dan cosinus	4.9.1 Menggunakan konsep aturan sinus dalam menyelesaikan masalah
	4.9.2 Menggunakan konsep aturan cosinus dalam menyelesaikan masalah

TUJUAN PEMBELAJARAN

Melalui kegiatan diskusi, tanya jawab, belajar mandiri, dan penguasaan individu menggunakan *schoology*, diharapkan peserta didik terlibat secara aktif, bekerja sama, percaya diri, mandiri, dan disiplin serta peserta didik dapat

1. Menjelaskan konsep aturan sinus
2. Menjelaskan ciri-ciri aturan sinus
3. Menggunakan konsep aturan sinus dalam menyelesaikan masalah

Figure 6. Basic Competencies, Learning Objectives

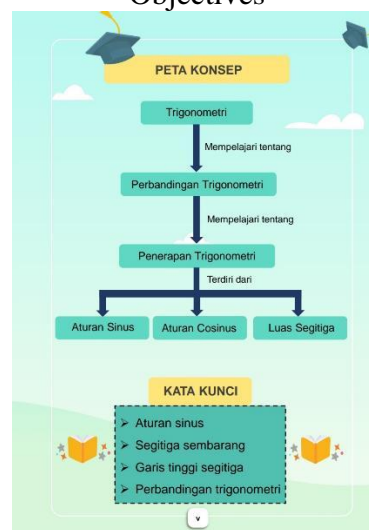


Figure 7. Concept Map and Keywords

APERSEPSI

"Apa manfaat dari materi yang saya pelajari?". Pertanyaan tersebut sering terlinda di pikiran kita. Sebagai induk dari segala ilmu, matematika memberikan manfaat yang sangat besar dalam kemajuan ilmu pengetahuan lain dan setiap aspek kehidupan kita.

Trigonometri merupakan bagian ilmu matematika yang mempelajari hubungan antara sisi dan sudut suatu segitiga. Trigonometri adalah nilai perbandingan yang didefinisikan pada koordinat kartesius atau segitiga siku-siku. Di dalam trigonometri, terdapat sebuah aturan yang memudahkan kita dalam menyelesaikan permasalahan, yaitu aturan sinus. Aturan sinus adalah perbandingan antara setiap sisi dan sinus sudut di depan sisi tersebut memiliki nilai yang sama. Aturan sinus ini berlaku pada segitiga, baik segitiga siku-siku maupun segitiga sembarang.

Tahukah kamu, bahwa menara Pisa itu tidak tegak lurus dengan tanah? Ya, pada awalnya, menara Pisa dibangun dengan ketinggian 57 m. Ternyata, tanah di lokasi pembangunan menara rentan akan kerapuhan, sehingga terjadi kemiringan. Pada jarak tertentu dari dasar menara diperoleh sebuah sudut elevasi, selanjutnya kita dapat menghitung derajat kemiringan menara dari posisi awalnya dengan menggunakan aturan sinus. Keren bukan?



Figure 8. Apperception

DOI: <https://doi.org/10.24127/ajpm.v11i1.4660>



Figure 9. Inspirational Figures



Figure 10. Materials and Item Sample

Teaching materials in the form of engaging animation PPT



Figure 11. Homepage

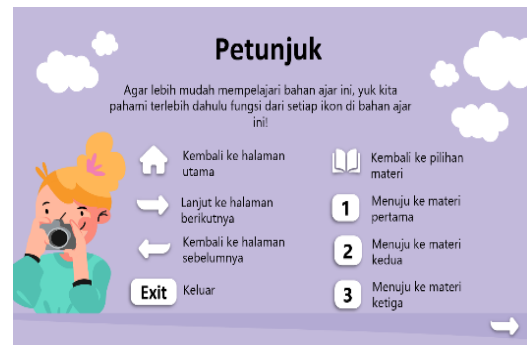


Figure 12. Instructions

Kompetensi Dasar & Indikator Pencapaian Kompetensi

Kompetensi Dasar	Indikator Pencapaian Kompetensi
3.9 Menjelaskan aturan sinus dan cosinus	3.9.1 Menjelaskan konsep aturan sinus
	3.9.2 Menjelaskan ciri-ciri aturan sinus
	3.9.3 Menjelaskan konsep aturan cosinus
	3.9.4 Menjelaskan ciri-ciri aturan cosinus
4.9 Menyelesaikan masalah yang berkaitan dengan aturan sinus dan cosinus	4.9.1 Menggunakan konsep aturan sinus dalam menyelesaikan masalah
	4.9.2 Menggunakan konsep aturan cosinus dalam menyelesaikan masalah

Figure 13. Basic Competencies and Achievement Competency Indicators



Figure 14. Learning Objectives




Figure 15. Apperception

DOI: <https://doi.org/10.24127/ajpm.v11i1.4660>

Aturan Sinus

Agar lebih mudah, mari kita dapatkan aturan sinus dengan menggunakan tiga garis tinggi dalam sebuah segitiga sembarang!

1. Garis tinggi yang dibentuk dari $\angle A$
2. Garis tinggi yang dibentuk dari $\angle B$
3. Garis tinggi yang dibentuk dari $\angle C$



Garis tinggi yang dibentuk dari $\angle A$

Karena $AC = b$

maka

$$AD = b \times \sin \angle C \quad (1)$$

Karena $AB = c$

maka

$$AD = c \times \sin \angle B \quad (2)$$

Berdasarkan persamaan (1) dan (2), maka kita memperoleh:

$$b \times \sin \angle C = c \times \sin \angle B$$

atau

$$\frac{b}{\sin \angle B} = \frac{c}{\sin \angle C} \quad (3)$$

Yuk kita perhatikan $\triangle ACD$! Jika kita fokus pada $\angle C$ maka kita akan memperoleh:

$$\sin \angle C = \frac{AD}{AC} \quad \text{atau} \quad AD = AC \times \sin \angle C$$

Selanjutnya, dengan cara yang sama jika kita fokus pada $\angle B$ maka kita akan memperoleh:

$$\sin \angle B = \frac{AD}{AB} \quad \text{atau} \quad AD = AB \times \sin \angle B$$

Figure 16. Materials



Figure 17. Schooly End Page

Schooly

Figure 18. Class Homepage

Figure 19. Folder Contents for Sine Rules

Figure 20. Folder Contents for Cosine Rules

Figure 21. Competency Test

Figure 22. Fill in The Blank Items

Figure 23. Multiple-Choice Items

Figure 24. Matching Items

Figure 25. Short Answer/Essay Question Items

DOI: <https://doi.org/10.24127/ajpm.v11i1.4660>

The design of learning media that have been designed will then be assessed by the validators and refined to become valid and practical.

3. Develop

At this development stage, an assessment of the learning media that have been developed is carried out to experts. This device was assessed by 4 experts, namely 3 lecturers and 1 mathematics teacher. The results of the validation of lesson plans and teaching materials in schoology are as follows.

Lesson Plans Validation

The results of the lesson plans validation carried out by the validators can be seen on the table 3:

Table 3. Lesson Plan Validation Results

Assessment Aspects	Average Score of the Aspects
The completeness of lesson plan components	4,58
Objectives in the lesson plan	4,55
Contents of the lesson plan	4,5
Time allocation in the lesson plan	4,5
Blended learning model that can practice self-regulated learning ability	4,5
The language used in the lesson plan	4,5

Based on the table 3, the final average of the validation results from all aspects in the developed lesson plan is 4,52. Based on table 1, it can be concluded that the development of blended learning model lesson plans using flipped classroom rotation to practice self-

regulated learning skills is categorized as highly valid.

Learning Materials Validation in Schoology

The average result of the assessment of teaching materials in schoology can be seen on the table 4:

Table 4. The Result of Learning Materials Validation in Schoology

Assessment Aspects	Average Score of the Aspects
Completeness of teaching materials components in schoology	4,71
The quality of teaching material contents in schoology	4,58
Language of teaching material in schoology	4,44
Presentation eligibility	4,13
Teaching material display in schoology	4,54
Teaching material utilization in schoology	4,45
Schoology Interface	4,42
Schoology application	4,5
Schoology utilization in blended learning	4,53

Based on the table 4, the final average of the validation results from all aspects of teaching materials in the developed schoology is 4,48. Based on table 1, it can be concluded that the development of teaching materials in schoology is considered highly valid.

Furthermore, to determine the practicality of the resulting device, a practicality assessment was carried out. This assessment was carried out referring to the scores obtained from the validation sheets.

DOI: <https://doi.org/10.24127/ajpm.v11i1.4660>

Lesson Plan Practicality

The results of the lesson plan practicality were obtained from the validation scores carried out by four validators can be seen on the table 5:

Table 5. The Results of Lesson Plan Practicality

Validator	Validation Scores	Practicality Scores
1	157	98,13
2	137	85,63
3	128	80,00
4	159	99,38

From the table 5, the average score of lesson plan practicality is 90,78. This means that the practicality of the lesson plans is in the "A" category, which means the lesson plans can be used without revision

Teaching Materials Practicality in Schoology

The practicality of teaching materials obtained from the validation scores given by four validators can be seen on the table 6:

Table 6. Teaching Materials Practicality in Schoology

Validator	Validation Scores	Practicality Scores
1	263	97,41
2	225	83,33
3	216	80,00
4	269	99,63

From the table 6, the average scores of the lesson plan practicality reached 90,10. This shows that the practicality of teaching material in schoology is in the "A" category, in other words, it can be applied without revision.

4. Disseminate

As a form of dissemination, the lesson plans and the resulting teaching materials are distributed to the MGMP Gresik through mathematics teachers at MAN 2 Gresik so that they can be utilized in the learning process.

The results of this developmental research are supported by relevant studies, including research conducted by (Wiryanto, 2018) about the blended learning model that is proven effective in improving self-regulated learning abilities in learning Mathematics. Furthermore, the research by (Purba et al., 2019) also explains that learning using schoology can significantly improve self-regulated learning abilities and student achievement. Then, supported by research results by (Purwitasari et al., 2019) who succeeded in proving that the application of schoology-based blended learning can increase students' active participation and learning achievement in mathematics.

The positive impact of this research is that lesson plans and teaching materials that have been packaged in schoology make it easier for teachers to prepare learning tools for teaching and can be applied in schools so that students' self-regulated learning abilities can be practiced. Then the learning model used in the lesson plans can practice students' self-regulated learning abilities, and teaching materials packaged in schoology can be a source of student learning that makes it easier to understand the concept of the sine and cosine rules. Students can study material and practice questions related to the sine and cosine rules anywhere and anytime.

DOI: <https://doi.org/10.24127/ajpm.v11i1.4660>

CONCLUSION AND SUGGESTION

Based on the results of data analysis, it can be concluded that the lesson plan of the blended learning model with flipped classroom rotation and teaching materials packaged in schoology to practice self-regulated learning skills is valid and practical to use.

The results of data analysis showed that the developed media, lesson plans, and teaching materials, are in the "highly valid" category with an average assessment of the lesson plan validity of 4.52 and an average assessment of the teaching materials validity of 4.48. In addition, the resulting media is also considered practical by experts with an average practicality rating of "A" which means that the developed media can be applied without revision.

The resulting media need to be tested on students to find out their effectiveness in practicing students' self-regulated learning abilities.

REFERENCES

- Fajri, N., & Nida, I. (2019). Analisis Kesulitan Siswa Kelas X Sma Negeri 6 Aceh Barat Daya Pada Materi Trigonometri. *Jurnal Ilmiah Pendidikan Matematika Al Qalasadi*, 3(2). <https://doi.org/10.32505/qalasadi.v3i2.1179>
- Febriani, H. (2021). Meningkatkan Kemandirian Belajar Siswa melalui Metode Blended Learning berbantuan Google Classroom pada Materi Kesetimbangan Kimia. *Jurnal Pendidikan Kimia Indonesia*, 5(1). <https://doi.org/10.23887/jpk.v5i1.31343>
- Febriyanti, F., & Imami, A. I. (2021). Analisis Self-Regulated Learning dalam Pembelajaran Matematika Pada Siswa SMP. *Jurnal Ilmiah Soulmath: Jurnal Edukasi Pendidikan Matematika*, 9(1). <https://doi.org/10.25139/smj.v9i1.3300>
- Hastuti, W. D. (2020). Membangun Motivasi dan Kemandirian Peserta Didik Berkebutuhan Khusus Melalui Flipped Classroom di Masa New Normal Covid-19. *Prosiding Webinar Magister Pendidikan Nonformal UNG | 181, September*.
- Hudaifah, F. (2020). Peran self regulated learning di era pandemi covid-19. *Jurnal Ilmiah Fakultas Keguruan Dan Ilmu Pendidikan*, 6(2).
- Kamarni, N., & Rahadian, H. (2021). Blended Learning in Improving Self-Regulated Learning and Student Quality in Islamic Microeconomic Course. *Proceedings of the 3rd International Conference on Educational Development and Quality Assurance (ICED-QA 2020)*, 506. <https://doi.org/10.2991/assehr.k.210202.095>
- Kusaeri, K., & Mulhamah, U. N. (2016). Kemampuan Regulasi Diri Siswa dan Dampaknya Terhadap Prestasi Belajar Matematika. *Jurnal Review Pembelajaran Matematika*, 1(1). <https://doi.org/10.15642/jrpm.2016.1.1.31-42>
- Nabilah, D. (2019). *Pengembangan Lembar Kerja Siswa Dan Media Lingkaran Untuk Melatihkan Keterampilan Verbalisasi Siswa Tunanetra Di Smp/Plb-A Ypab Surabaya*. <http://digilib.uinsby.ac.id/31422/>
- Purba, A., Sipahutar, H., & Edi, S. (2019). *Comparison of Self-*

DOI: <https://doi.org/10.24127/ajpm.v11i1.4660>

- Regulated and Students' Learning Achievements by Using E-learning Based Schoology and Power Point on Biology Materia.*
<https://doi.org/10.4108/eai.18-10-2018.2287189>
- Purwitasari, D. I., Astawa, I. W. P., & Sudiarta, I. G. P. (2019). Penerapan Blended Learning Berbantuan Schoology Untuk Meningkatkan Keaktifan Dan Prestasi Belajar Matematika Siswa Kelas Viii A1 Smp Negeri 6 Singaraja. *Jurnal Pendidikan Dan Pembelajaran Matematika Indonesia*, 8(2).
<https://doi.org/10.23887/jppm.v8i2.2852>
- Sholekah, N. (2018). *Pengembangan Pembelajaran Matematika Model Missouri Mathematic Project Dengan Pendekatan Belajar Dalam Kitab Ta'lim Muta'allim Untuk Meningkatkan Living Value Siswa.*
<http://digilib.uinsby.ac.id/27286/>
- Sucipto, S. (2017). Peningkatan Self Regulated Learning Mahasiswa Di Era Digital Melalui Pembelajaran Blended Learning. *Soulmath*, 5(1).
<https://doi.org/10.25139/sm.v5i1.455>
- Tsaniyah, S. F., Ayu, H. D., & Pratiwi, H. Y. (2019). Pengaruh Model Blended Learning menggunakan Schoology Terhadap Prestasi Belajar ditinjau Dari Kemandirian Belajar Siswa. *RAINSTEK : Jurnal Terapan Sains & Teknologi*, 1(1).
<https://doi.org/10.21067/jtst.v1i1.3236>
- Wicaksono, D. P., Kusmayadi, T. A., & Usodo, B. (2014). Pengembangan Perangkat Pembelajaran Matematika Berbahasa Inggris Berdasarkan Teori Kecerdasan Majemuk (Multiple Intelligences) Pada Materi Balok Dan Kubus Untuk Kelas Viii Smp. *Jurnal Pembelajaran Matematika*, 2(5).
- Wiryanto, H. (2018). *Pengaruh Model Blended Learning Berbasis Moodle Terhadap Kemampuan Self-Regulated Learning Siswa Dalam Belajar Matematika.*
<http://digilib.uinsby.ac.id/28631>
- Yuliantini, Y. M., Aunurrahman, A., & Darajat, A. (2020). Teaching Reading Comprehension By Using Experience-Text-Relationship Method To Senior High School Students. *Edukasi: Jurnal Pendidikan*, 18(2).
<https://doi.org/10.31571/edukasi.v18i2.1837>