Cendikia : Media Jurnal Ilmiah Pendidikan, 13 (3) (2023) pp. 489-500

Published by: IOCSCIENCE

Cendikia : Media Jurnal Ilmiah Pendidikan

Journal homepage: www.iocscience.org/ejournal/index.php/Cendikia

Development of lift the flap book as memet (mathematics learning media) trigonometry materials for high school students

Nia Kurniaty Rukman[1], Ryan Nizar Zulfikar[2], Aida Puji Rahayu[3]

[1,2,3]Pendidikan Matematika, Fakultas Keguruan dan Ilmu Pendidikan, Universitas Muhammadiyah Kupang, Indonesia

ARTICLE INFO

Article history:

Received Jan 02, 2023
Revised Jan 16, 2023
Accepted Jan 30, 2023

Keywords:

Lift the Flap Book;
Mathematics Learning Media;
Trigonometry;

ABSTRACT

This study intends to examine the viability, practicability, and efficacy of the lift-the-flap book as a trigonometry learning tool for high school students. This study uses the ADDIE approach for research and development (R&D). In this study, the population consisted of X grade students from SMA Negeri 1 Kupang, and the sample consisted of 31 XC grade kids. Data collection approaches employing questionnaires and assessments. Analyses of data's validity, applicability, and efficacy are data analysis methodologies. The findings of research on mathematics learning media lift-the-flap books for high school trigonometric comparative materials. The findings of material expert testing were 91.7% with a very good category, while the results of media expert testing were 94.6% with a very valid category. Based on the findings of the teacher's reaction with an average percentage value of 92% in the very good category and the average student response of 87.74%, the media is deemed practical. After passing the learning outcome test with an average score of 87.1% based on extremely good criteria, the media is utilized effectively in the learning process. Therefore, it can be concluded that the produced lift-the-flap book learning media can be applied to the study of mathematics trigonometric comparison material.

Corresponding Author:

Nia Kurniaty Rukman,
Pendidikan Matematika,
Fakultas Keguruan dan Ilmu Pendidikan,
Universitas Muhammadiyah Kupang,
K. H. Ahmad Dahlan Street, Kayu Putih, Oebobo District, Kupang City, East Nusa Tenggara, 85228, Indonesia
Email: niarukman@gmail.com

INTRODUCTION

Mathematics has an important role because it is the basis for logic or reasoning and quantitative solutions that are useful in every aspect of life, for example in the fields of health, economics, technology, physics, education, architecture, art and astronomy(Son, 2018). The development of today's modern technology, mathematics has become a universal science that underlies and has an

important role in various disciplines and trains human thinking power. Mathematics is taught not only about memorized facts but mathematics is taught so that students are able to study and think, because mathematics is a basic science that has a role in applied science.(Nurafni et al., 2020).

Mathematics is one of the compulsory subjects at every level of education from elementary school to university which will equip students with the ability to think logically, analytically, systematically, critically and creatively and be able to work together.(Nurafni et al., 2020). In addition, mathematics is very necessary in everyday life, for example in the buying and selling process in the market (Sulistyaningrum et al., 2015). However, learning mathematics is still considered difficult by some students. This difficulty is due to its abstract nature(Fadholi & Waluya, 2015).

Learnmathematics becomes difficult, boring and less desirable because in learning mathematics there are many formulas and calculations that function as problem solving and only learning to find numbers, formulas, and graphs, especially in trigonometry subjects. Trigonometry is included in one of the materials tested in the National Examination with its own level of difficulty(Son, 2018). Trigonometry is one of the materials included in the components of the Graduate Competency Standards (SKL) class XI IPA, one of the components is understanding the formula for the sine cosine of the difference and the sum of two angles, the formula for the difference and the sum of sines and cosines, and using it in problem solving, this is written in the Regulation of the Minister of National Education of the Republic of Indonesia no. 23 of 2006.

According to the Big Indonesian Dictionary (2012) written trigonometry is often defined as the science of measuring the angles and boundaries of triangles.(Kariadinata, 2018)Trigonometry functions and triangular angles in the branch of mathematics are always related to trigonometry. Learning trigonometry is enabled to find the relationship between the sides of the angles in a triangle. There is also learning about the concept of congruence with right angles which is the basis of trigonometry(Nugroho, 2017). But in reality there are still students who find it difficult to learn the material.

The difficulties that occur for most students are in terms of connecting trigonometry concepts and completing calculations in trigonometry. This is in line with research from Sholihah and Subroto(Sholihah, 2018)which gives the result that students have not been able to relate one concept/principle to another concept/principle and there are only a few students who can solve problems with indicators of relational understanding correctly. Lack of understanding of concepts and principles can have a negative impact on students and teachers as teaching staff, because students and teachers become unmotivated or lack enthusiasm to face the next material(Veranita & Setyadi, 2021).

Learning that is still conventional and limited learning media is the cause. Teaching and learning activities generally only rely on teachers and books. But the book as a learning resource that exists today is actually verbalistic, so it makes students bored because the sentences used are stiff and uncommunicative(Lesmono et al., 2021). Then the teaching and learning process which is monotonous and less creative, sometimes makes students feel bored and bored. So that causes many students to be sleepy when taught, not concentrating, busy alone, etc. which results in the material being taught cannot be absorbed properly by students(Triyono, 2014).

In addition, the use of learning media in schools is still not optimal. Optimizing the use of appropriate media is a means to streamline the process of delivering subject matter to students. Students are expected to find it easier to understand the material presented and be able to create a conducive atmosphere during the learning process(Rahmawati, 2018). By packing interesting lessons through learning media, it will train students' concentration and understanding(Astutik et al., 2018).

Media is one of the factors that also determines the success of learning because the media can assist teachers in conveying subject matter in relation to the lesson objectives that have been formulated in lesson plans. Learning media is recognized as one of the success factors of learning

because it can motivate students, students can be actively involved physically and psychologically, maximize all students' senses in learning, and make learning more meaningful(Fadhli, 2015). In line with that, creative use of media will enable students to easily absorb the subjects studied. Utilization of learning media is expected to increase the effectiveness of learning(Son, 2018)**.**Therefore, the use of media during the learning process is an important element besides teachers and students, because it can assist teachers in conveying messages or learning materials to students.

Based on the problems above, learning mathematics requires innovation as a support for learning without having to deal with boring learning in the classroom. Efforts to improve the learning process can be in the form of developing learning media and learning methods. One interesting learning media that teachers can use is the lift the flap book. Dimensional visualization-based media can make the appearance of the book more attractive, so that the message conveyed will be easily understood by readers. Therefore, the lift the flap book is considered suitable when used in learning mathematics, because apart from being able to convey the contents of learning material, the lift the flap book is a visual medium that displays book pages containing information when opened,(Umayah et al., 2011).

*the elevator*flap book is one of the variations in the development of the world of printed books. The book facility in this design does not only provide knowledge but also as an interesting medium for students who prefer to read. Lift the flap book is a type of interactive book where certain parts of the book page can be opened to find out the surprise behind that part(Oey et al., 2013).(Rahmawati, 2018)mentions that the lift the flap book is a book with windows that has pictures or information behind each window that can be opened and closed. The use of the lift the flap book can be adjusted to the learning material to be delivered.(Ainurohmah & Bambang Sigit, 2012)said that a windowed book is a book that has a window (flap) that contains a description of the material or pictures. The existence of this window book helps in summarizing material so that it is more focused and easy to understand. The use of concrete media when learning is able to explain abstract things and help students more easily understand the material(Hadiyati & Wijayanti, 2017).

The existence of a window (flap) in the book is a new thing for students. A flap book design that has lots of pictures can stimulate students' attention and interest. If students' interests can be aroused and their attention can be focused on learning materials that have been prepared clearly and focused, then the learning process will take place well, easily accepted and understood by students.(Barroh, 2012). Combining learning media is needed to achieve learning goals. The product to be made is*lift the flap book*designed for interaction with its users. Media lift the flap book has a special shape, in which each sheet has a window and uses an attractive color and image design that makes it possible to use it as a means of learning media in trigonometry material.

RESEARCH METHODOLOGY

This research is a type of research and development or Research and Development (R&D), which is a type of research that aims to develop and produce a product.(Sugiyono, 2016)states that the R&D method is a method used to produce certain products and test the effectiveness of these products. This study also uses the ADDIE model which consists of five stages, namely: analyze, design, develop, implement, and evaluate. The selection of the ADDIE model is based on the consideration that this model is easy to understand, besides that ADDIE is developed systematically and is based on the theoretical foundation of the developed learning design.(Andrizal & Arif, 2017).

RESULTS AND DISCUSSIONS

The results of the development carried out by this researcher produced learning media in the form oflift the flap bookfor trigonometry comparison material. This research and development was carried out using the ADDIE development procedure which went through 5 stages of development. The stages of the research and development procedure carried out are as follows:

1. Analysis Phase (Analyze)

The analysis phase is the first stage in this research and development, because the results of this analysis are the guidelines and benchmarks in the preparation of instructional media. The analysis carried out includes:

a. Needs Analysis

Needs analysis was carried out at SMA Negeri 1 Kupang to find out the problems faced by students in learning as well as a school where product development trials were conducted or where researchers conducted research. Researchers also conducted interviews with mathematics teachers at Kupang 1 Public High School, obtained information that in learning there was no specific method used, the teacher still used the lecture method. The teaching material that is often used is textbooks, but there are some students who still have difficulty understanding the material. The teacher also said that he had made media in the form of PPT, but had never developed media. In the learning process, the teacher explains the material to students and then the teacher gives practice questions. When given training,

b. Study of literature

A literature study is carried out by looking for studies that have been published in a journal or looking for articles that are related to this research and then used as a reference for designing the developed lift the flap book media.

2. StageDesign (Design)

a. Material Assessment

Based on the analysis stage, the material used to develop the lift the flap book learning media is trigonometry comparison material for class X students of the 2013 curriculum. Trigonometry comparison material consists of trigonometry comparisons of an angle in a right triangle, trigonometry comparisons of special angles, and angles of depression. and elevation angle. The material presented in the lift the flap book is sourced from the Mathematics book for SMA/MA class X 2013 Curriculum from the Ministry of Education and Culture and the Class X Comparative Trigonometry LKS book compiled by a mathematics teacher at SMA Negeri 1 Kupang.

b. Initial Plan

The design was made based on the characteristics of the lift the flap book with the selection of formats containing images that can be opened to show information or contain material. In addition, the lift the flap book also contains material summaries that are expected to make it easier for students to understand the material being taught. The initial stage is the preparation of the material. Next will make a design for the appearance of the lift the flap book media starting from the cover, KI and KD, indicators and learning objectives, materials and questions as well as ideas on how to shape, look, and what will be included in the lift the flap book along with the design layout, so that the display of the lift the flap book is not only in the form of a concept, but already contains the display of the lift the flap book to be printed.

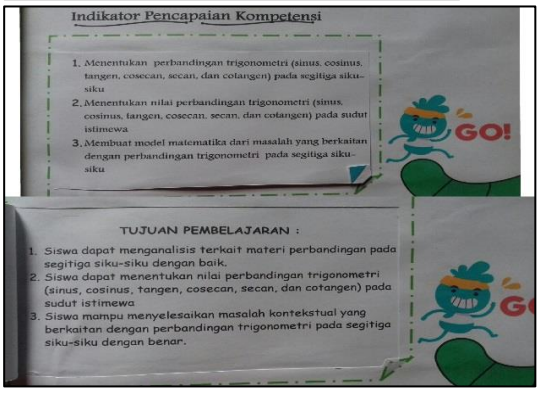
3. Development Stage (Development)

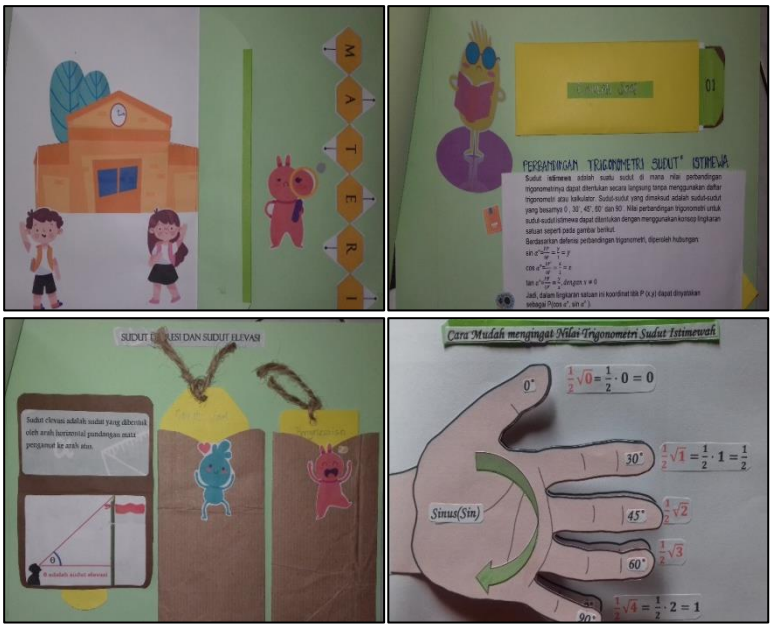
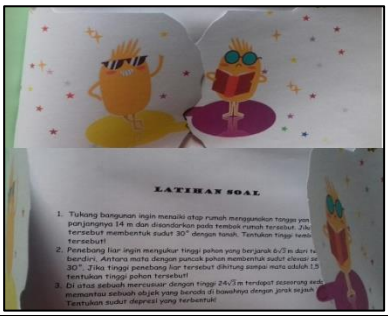
After carrying out the planning stage, then carry out the development stage. The stages of development are as follows:

a. Manufacturing of The Flap Book Elevator

*Lift the flap book*which was developed aims to facilitate and increase students' interest in learning trigonometry comparative mathematics material. The following is media development*lift the flap book :*

Table 1.
Display Design Media lift the flap book

No	Indicator	Media View
1	Cover	
2	KI and KD	
3	Indicators and Learning Objectives	

4	Material	
5	Exercises	

b. Product Validation

1) Media Expert Validation

The validation of media experts was carried out by a lecturer at FKIP Muhammadiyah University of Kupang who teaches mathematics who has competence in the field of instructional media, namely Ms. Agustin Fatmawati. Media expert validation is carried out by filling out a media assessment questionnaire and the media expert validation data can be seen in the table2following.

Table 2.
Results of Media Expert Validation by Validators

No	Rated aspect	Score	Category
A. Staining			
1.	Interesting medium color combinations	4	Very good
2.	Color does not interfere with the material	4	Very good
B. Use of words or language			
3.	The language used is in accordance with the EYD	4	Very good
4.	The language used is easy to understand	4	Very good
5.	The language used is consistent	4	Very good
6.	The size of the font on the media is clear	3	Well
7.	Presentation of material in the media is clear and easy to understand	3	Well

C. Graphics and Design			
8.	Original display design	4	Very good
9.	Interesting media display	4	Very good
10.	Media can be used as an alternative learning	4	Very good
11.	Media is easy and safe to use	4	Very good
12.	The media is strong and not easily damaged	3	Well
13.	Media is flexible (easy to move and carry)	4	Very good
14.	The media is practical, that is, it is not difficult to open each page	4	Very good
	Total score	53	
	Average Percentage (%)	94.6	Very Valid

Based on table 2 above, the overall average acquisition criteria is very good. The validation results by the validator got a value of 94.6% with a very valid category. Therefore, the lift the flap book learning media developed according to media experts is said to be very good and feasible to usewith a few revisions.Based on the assessment of the media expert validator, the authors received criticism and suggestions, namely to improve the cover and bind it neatly.

2) Material Expert Validation

Material expert validation was carried out by a teacher at SMA Negeri 1 Kupang who is in charge of mathematics, namely Mrs. Harlina Kitu. Material expert validation was carried out by filling out a material assessment questionnaire and the material expert validation data can be seenin the following table:

Table 3.
Material Expert Validation Results by Validators

No	Rated aspect	Score	Category
A. Learning			
1	Media is used for small group and class learning	4	Very good
2	Media is relevant to the material that students must learn	4	Very good
B. Curriculum			
3	The media is in accordance with the applicable curriculum	3	Very good
4	Objectives and benefits are clearly stated	3	Well
C. Content Material			
5	The content of the material has a correct and precise concept	4	Very good
6	Content of the material according to Basic Competency (KD)	4	Very good
7	The content of the material is in accordance with the achievement indicators	4	Very good
8	The content of the material is in accordance with the level of intellectual development of students' cognition	3	Very good
D. Interaction			
9	The media is easy to operate/use	4	Very good
10	Users do not get tired of using the media	4	Very good
11	The material includes illustrations and examples of questions	4	Very good
12	In practice questions, the media encourages students to try to get the right answer	3	Well
	Number of Scores obtained	44	
	Average Percentage (%)	91.7	Very good

Table 3 is the result of a questionnaire that has been filled in by the material expert validator. Based on the table above, it can be seen that the average percentage score obtained is 91.7% in the very good category. Thus, the lift the flap book learning media developed according to material

experts is said to be very good and the media is feasible to use. Based on the assessment of the material expert validator, the media can be used in the mathematics learning process with a little revision.

4. Implementation Stage (Implementation)

After the media was declared feasible based on the validation results, then the product was tested in XC class of SMAN 1 Kupang with a total of 31 students. This trial aims to find out whether this product is interesting to be used as a reference for student learning. The steps of learning in the classroom are before entering the learning material, the researcher first explains how to use the lift the flap book. Then proceed with group learning, with groups that have been arranged by researchers. Students are divided into4 groupswith one group consisting of seven students and another group consisting of 8 people. Each group consists of students with heterogeneous abilities. Students are asked to explore the information contained in the book, assisted by an explanation from the researcher on each sub-material. After the trial process by the teacher and students, the researcher analyzed the evaluation test of student learning outcomes to determine the effectiveness of the developed lift the flap book media. The following is a recapitulation of student test results:

Table 4.
Student Test Results Recapitulation Data

No	Student Code	Score Question Number			Mark	KKM Description
		1	2	3		
1.	C1	25	35	25	85	complete
2.	C2	30	35	20	85	complete
3.	C3	20	35	25	80	complete
4.	C4	30	40	30	100	complete
5.	C5	25	40	30	95	complete
6.	C6	30	30	20	80	complete
7.	C7	30	40	30	100	complete
8.	C8	30	30	25	85	complete
9.	C9	30	25	15	70	Not Completed
10	C10	30	35	20	85	complete
11	C11	25	35	25	85	complete
12	C12	15	15	20	50	Not Completed
13	C13	30	35	20	85	complete
14	C14	30	15	20	65	Not Completed
15	C15	30	30	30	90	complete
16	C16	30	30	30	90	complete
17	C17	25	40	30	95	complete
18	C18	30	40	25	95	complete
19	C19	30	25	25	80	complete
20	C20	30	35	20	85	complete
21	C21	25	30	25	80	complete
22	C22	30	20	30	80	complete
23	C23	30	25	30	85	complete
24	C24	30	15	20	65	Not Completed
25	C25	30	30	25	85	complete
26	C26	30	25	25	80	complete
27	C27	30	20	30	80	complete
28	C28	30	30	25	85	complete
29	C29	25	25	30	80	complete
30	C30	25	35	20	80	complete
31	C31	30	30	30	90	complete
Average Percentage (%)					87,1	
Criteria					Very effective	

Based on table 4 it can be seen that the lowest score obtained by students is 50 and the highest score obtained by students is 100. Learning is said to be successful if at least 75% of students achieve the predetermined mastery score. Students are said to be successful or complete if they get a score greater than or equal to the KKM score, namely 75. Student learning test resultsobtained 4 students did not reach the valueKKM. Average percentage valueclassical completeness of 87.1%. The percentage of student learning outcomes shows that the media developed is good in terms of its effectiveness.

5. Evaluation Stage

From the results of trials on teachers and students, it was shown that in general the teachers gave a good response to the lift the flap book media for the trigonometry comparison material being developed.The drawback of the lift the flap book learning media is that it only focuses on one material so that the lift the flap book learning media only helps students understand trigonometry comparison material and it is hoped that there will always be updates in developing learning media for subsequent materials. In general, students gave a positive impression of the media they used during the trial. The impression is in the form of their interest in the media that has been developed. It's different with the teacher, the teacher gives more technical comments to the media. The input is to further develop the material presented as a whole so that the resulting media is more perfect. During the product trial process, The research also experienced various obstacles such as noisy school conditions because there were students who were practicing drum bands so that when explaining the use of the media did not run optimally. In addition, the time available is limited so that students cannot use it optimally.

validity

This study developed a lift the flap book learning media for trigonometry comparison material. The manufacturing process is carried out according to the ADDIE development model flow which consists of 5 stages. Before being tested, the media must go through the validation stage. Validity is an absolute requirement for the development design before the development trial is carried out at the next stage, namely implementation.

Based on expert data analysis, the validity of the lift the flap book learning media for trigonometry comparison material according to the assessment of media experts gets a percentage value94.6%with the Very Valid category. So according to the validity criteria from Sugiyono (2019) it can be concluded that the lift the flap book learning media is in the 81.25 category $<p \leq 100$, which is very valid to use in terms of media. Thus, based on relevant research the results of media validation are in accordance with the validity criteria so that valid media are developed and used with minor revisions.

While the results of the data analysis on the validity of the lift the flap book learning media based on the assessment of material experts got a percentage value91.7%very good category. So according to the validity criteria of(Sugiyono, 2019)it can be concluded that the lift the flap book learning media is in the 81.25 category $<p \leq 100$ which is very valid to use in terms of material. Therefore it can be said that according to the results of the material validation that has been carried out, the material in the lift the flap book media is appropriate and feasible to implement. This is in line with research(Nababan, 2020), media that have reached the valid category by material experts and media experts are suitable for use and tested on users.

Practicality

The practicality of the developed lift the flap book media can be seen based on the results of the questionnaire analysis of teacher and student responses to the media that has been implemented.Based on the calculation results of the teacher's response questionnaire, a percentage score of 92% was obtained in the very good category. According to the validity criteria of(Sugiyono, 2019)it can be concluded that the learning media lift the flap book is in the category $81.25<p\leq100$ with very good category. The results of this calculation indicate that the teacher strongly agrees that learning is carried out using the lift the flap book media that has been developed. The results of the student response questionnaire that was filled in when the learning was finished were known to get a percentage score of 87.74%. The calculation results are in the very good category according to the validity criteria of(Sugiyono, 2019). This shows that students strongly agree to learn using the lift the flap book media that has been developed.

Research conducted by(Andrizal & Arif, 2017)argues that media that is easy to access and use is media that is practically used in learning. Judging from the calculation results of the teacher and student response questionnaires, the average implementation results were very good. He obtained a very good average on the implementation of media use, because this media is something new that makes students interested. However, this media is a new thing for students, so an explanation is needed from the teacher so that students get used to using this learning media.

Effectiveness

The effectiveness of the lift the flap book learning media is seen based on student activities and analysis of learning achievement tests. Field trials with 31 students and 1 math teacher. Data from the results of the analysis of the learning outcomes test for class XC students at SMA N 1 Kupang after using the lift the flap book learning media in trigonometry comparison material received a final percentage score of 87.1%. The results of the calculations are in the very effective category according to the guidelines for the level of effectiveness of learning outcomes from(Widoyoko, 2013). In addition, effectiveness can also be seen from students who score above the KKM more than students who score below the KKM.

The effectiveness of the developed media is also obtained based on student activities when learning to use the media. This is in line with research(Rasiman, 2014)which reveals that as long as students learn to use flip book learning media activities and learning outcomes have increased. Based on the results of observations of student activity, all students were very active. In addition, students were enthusiastic in answering questions and it could be seen that students discussed well and were responsible for their respective groups. Effective learning media are learning media that provide opportunities for self-study or carry out the widest possible activities for students(Andrizal & Arif, 2017).

CONCLUSION

Based on the results of research and development of the lift the flap book learning media for learning mathematics on trigonometry comparison material, it can be concluded that the lift the flap book learning media for learning mathematics on trigonometry comparison material was developed with reference to the ADDIE development model which includes 5 stages, namely analysis, design (design), development (development), implementation (implementation), and evaluation (evaluation). The validation results of the lift the flap book learning media for learning

mathematics on trigonometry comparison material show that the media is in a very valid category, so the media is feasible to use. The results of calculations on teacher responses and student responses to the media used show that the media is in the very good category. Therefore, the developed media is practically used for learning mathematics trigonometry comparison material. The effectiveness of the media can be seen from the results of student test results, where students who score above the KKM are more compared to students who score below the KKM. In general, students are very interested in the media being developed and the material contained in it is easy to understand.

References

Ainurohmah, R., & Bambang Sigit, W. (2012). Pengembangan Perangkat Pembelajaran dengan Buku Berjendela pada Materi Gejala-gejala Atmosfer Kelas VII di SMPN 3 Balongpanggang Gresik. *Jurnal Pendidikan Geografi*.

Andrizal, A., & Arif, A. (2017). Pengembangan Media Pembelajaran Interaktif Pada Sistem E-Learning Universitas Negeri Padang. *INVOTEK: Jurnal Inovasi Vokasional Dan Teknologi*, *17*(2), 1–10.

Astutik, I. P., Rasiman, R., & Handayani, D. E. (2018). Pengembangan Buku Berjendela pada Pembelajaran IPA Kelas V Sekolah Dasar. *JIPVA (Jurnal Pendidikan IPA Veteran)*, *2*(1), 102–110.

Barroh, H. (2012). Pengembangan buku ajar berjendela pada materi sistem reproduksi manusia untuk SMP RSBI. *Berkala Ilmiah Pendidikan Biologi (BioEdu)*, *1*(2), 5–9.

Fadhli, M. (2015). Pengembangan Media Pembelajaran Berbasis Video Kelas Iv Sekolah Dasar. *Jurnal Dimensi Pendidikan Dan Pembelajaran*, *3*(1), 24–29. https://doi.org/10.24269/dpp.v3i1.157

Fadholi, T., & Waluya, B. (2015). Analisis Pembelajaran Matematika Dan Kemampuan Literasi Serta Karakter Siswa SMK. *Unnes Journal of Mathematics Education Research*, *4*(1).

Hadiyati, N., & Wijayanti, A. (2017). Keefektifan metode eksperimen berbantu media benda konkret terhadap hasil belajar ipa siswa kelas V sekolah dasar. *JIPVA (Jurnal Pendidikan IPA Veteran)*, *1*(1), 24–31.

Kariadinata, R. (2018). *Trigonometri dasar*. CV Pustaka Setia.

Lesmono, A. D., Wahyuni, S., & Alfiana, R. D. N. (2021). Pengembangan bahan ajar fisika berupa komik pada materi cahaya di SMP. *Jurnal Pembelajaran Fisika*, *1*(1), 100–105.

Nababan, N. (2020). Pengembangan Media Pembelajaran Berbasis Geogebra Dengan Model Pengembangan Addie Di Kelas Xi Sman 3 Medan. *Inspiratif: Jurnal Pendidikan Matematika*, *6*(1).

Nugroho, A. A. (2017). *Pengembangan Media Pembelajaran Berbantuan Blog Pada Materi Trigonometri*. UIN Raden Intan Lampung.

Nurafni, A., Pujiastuti, H., & Mutaqin, A. (2020). Pengembangan bahan ajar trigonometri berbasis kearifan lokal. *Journal of Medives: Journal of Mathematics Education IKIP Veteran Semarang*, *4*(1), 71–80.

Oey, F. W., Waluyanto, H. D., & Zacky, A. (2013). Perancangan buku interaktif pengenalan dan pelestarian sugar glider di indonesia bagi anak 7-12 tahun. *Jurnal DKV Adiwarna*, *1*(2), 11.

Putra, T. A. (2018). *Pengembangan media pembelajaran animasi berbasis macromedia flash pada materi trigonometri*. UIN Raden Intan Lampung.

Rahmawati, C. (2018). *Perancangan Flap Book Sebagai Sarana Pengenalan Permainan Tradisional Indonesia Untuk Anak Usia 7-10 Tahun*. State University of Surabaya.

Rasiman, R. (2014). EFEKTIVITAS RESOURCE-BASED LEARNING BERBANTUAN FLIP BOOK MAKER DALAM PEMBELAJARAN MATEMATIKA SMA. *EFEKTIVITAS RESOURCE-BASED LEARNING BERBANTUAN FLIP BOOK MAKER DALAM PEMBELAJARAN MATEMATIKA SMA*, *1*(2), 34–41.

Sholihah, W. (2018). Analisis hambatan belajar pada materi trigonometri dalam kemampuan pemahaman matematis siswa. *IndoMath: Indonesia Mathematics Education*, *1*(2), 109–120.

Sugiyono. (2016). *Metode Penelitian dan Pengembangan (Research and Development/R&D)*. Alfa Beta.

Sugiyono. (2019). *Metode Penelitian Pendidikan*. Penerbit Alfabeta.

Sulistyaningrum, D. E., Karyanto, P., & Sunarno, W. (2015). Pengembangan modul berbasis model pembelajaran arias untuk memberdayakan motivasi dan berpikir kritis siswa pada materi ekosistem. *Inkuiri*, *4*(1), 104–116.

Triyono, D. (2014). *PENGEMBANGAN MEDIA PEMBELAJARAN BERBASIS MACROMEDIA FLASH 8 UNTUK PEMAHAMAN KONSEP GARIS SINGGUNG LINGKARAN SISWA SMP KELAS VIII*. Universitas Muhammadiyah Ponorogo.

Umayah, D., Haryani, S., & Sumarni, W. (2011). Pengembangan Modul Pop-Up Untuk Pembelajaran IPA

Model Kooperatif Dan Metode Diskusi. *UNNES Science Education Journal*, *2*(2).
Veranita, P., & Setyadi, D. (2021). Pengembangan Media Pembelajaran "Mathjong Trigonometri" pada Pembelajaran Matematika Trigonometri. *Jurnal Cendekia: Jurnal Pendidikan Matematika*, *5*(3), 2846–2856.
Widoyoko, P. (2013). *Teknik Penyusunan Instrumen Penilaian*. Pustaka Belajar.