Jurnal Axioma
Jurnal Matematika dan Pembelajaran

Volume 8 | No 2 | Juli | 2023

UNIVERSITAS ISLAM JEMBER
FAKULTAS KEGURUAN DAN ILMU PENDIDIKAN

Articles

Penentuan Return Saham Syariah dengan Arbitrage Pricing Theory (APT) melalui Pendekatan Vector Autoregressive (VAR)

Seftina Diyah Miasary
124-134

[pdf]

DOI : https://doi.org/10.56013/axi.v8i2.1433

Abstract View: 73, pdf Download: 70

Pengaruh Outdoor Learning Terhadap Sikap Siswa Pada Mata Pelajaran Matematika

Prima Crismono
135-143

[pdf]

DOI : https://doi.org/10.56013/axi.v8i2.1962

Abstract View: 75, pdf Download: 50

Bilangan Kromatik Graceful Pada Keluarga Graf Grid

Arika Indah Kristiana, Anzori Anzori, Robiatul Adawiyah, Slamin Slamin, Ermita Rizki Albirri
144-155

[pdf]

DOI : https://doi.org/10.56013/axi.v8i2.1544

Abstract View: 141, pdf Download: 168

Lesson Study Kaitannya dengan Peningkatan Kompetensi dalam Pembelajaran

Komarudin A, Moh. Abdul Qohar, Sholahudin Al Ayubi
156-167

[pdf]

DOI : https://doi.org/10.56013/axi.v8i2.2058

Abstract View: 54, pdf Download: 45

Pamekasan's Ghetak Mask Dance Movement in Ethnomathematics

Moh. Zayyadi, Yeyen Dwi Septiani
168-185

[pdf]

DOI : https://doi.org/10.56013/axi.v8i2.2060

Abstract View: 38, pdf Download: 24

Development of Swishmax-4 Learning Media in Education Courses and Basic Concepts of Mathematics

Iesyah Rodliyah
186-196

[pdf]

DOI : https://doi.org/10.56013/axi.v8i2.2062

Abstract View: 22, pdf Download: 31

Penerapan Reward dan Punishment untuk Meningkatkan Hasil Belajar Siswa Kelas VIII SMP Negeri 2 Tenggarong Seberang

Sulis Setiawati, Zainuddin Untu, Auliaul Fitrah Samsuddin   197-206

📄 pdf

📊 Abstract View: 51, 🔴 pdf Download: 35

Dampak Pembelajaran Daring terhadap Hasil Belajar Matematika pada Pembelajaran New Normal Siswa Kelas V SD

Ahmat Wakit   207-219

📄 pdf

📊 Abstract View: 69, 🔴 pdf Download: 44

Analisis Kesalahan Siswa Dengan Tipe Berpikir Semikonseptual Berdasarkan Teori Nolthing

Ulul Iftha Frahnadya, Christine Wulandari Suryaningrum, Chusnul Khotimah Galatea   220-227

📄 pdf

📊 Abstract View: 43, 🔴 pdf Download: 23

Development of Swishmax-4 Learning Media
in Education Courses and Basic Concepts of Mathematics

Pengembangan Media Pembelajaran Swishmax-4
pada Mata Kuliah Pendidikan dan Konsep Dasar Matematika

Iesyah Rodliyah[1], Claudya Zahrani Susilo[2,] Novia Dwi Rahmawati[3]
iesyahrodliyah90@gmail.com

Universitas Hasyim Asy'ari Jombang

Abstrak
Media pembelajaran sangat dibutuhkan untuk mempermudah proses pembelajaran matematika. Media pembelajaran disiapkan oleh pendidik untuk membuat siswa lebih aktif. Penelitian ini bertujuan untuk mengembangkan media pembelajaran Swishmax-4 pada mata pelajaran pendidikan khususnya konsep matematika dasar. Jenis penelitian yang digunakan berupa penelitian dan pengembangan menggunakan model ADDIE tetapi yang dimodifikasi. Hasil peneltian yang diperoleh menunjukkan validasi ahli terhadap media pembelajaran yang dikembangkan diperoleh kategori "valid" atau layak digunakan. Selain itu respon siswa terhadap media pembelajaran yang dikembangkan juga baik. Hasil pengaruh yang dilihat dari hasil belajar termasuk dalam kategori efektif, sedangkan hasil uji kepraktisan dari angket menunjukkan bahwa media ini praktis untuk digunakan
Kata kunci: *swishmax 4.0,* dan pendidikan dan konsep dasar matematika

Abstract
Learning media is needed to facilitate the process of learning mathematics. The learning media prepared by educators to make students more active. This study aims to develop Swishmax-4 learning media in the educational subject matter especially basic mathematical concepts. The type of research used by researchers in research and development using the modification of the ADDIE model. The results showed that the expert validation of the developed learning media obtained the category "valid" or suitable to use. In addition, student responses to the learning media that were developed were good. The results of the effects seen from the learning outcomes are included in the effective category, while the results of the practicality test from the questionnaire show that the media is practical to use.
Keywords: swishmax 4.0, and education and basic concepts of mathematics.

INTRODUCTION

Information and Communication Technology (ICT) is developing rapidly in various fields of life. This makes the target of disruption even more prominent in the 21st century, especially at university institutions. Indonesian universities are becoming increasingly silent in Asia. One reason is the lack of innovation in everything especially innovating in developing education. Fernando (1980) (in Selman) states, "Innovation is always related to some practical 'in-the-world' value. It is about making new tools, products or processes, bringing forth something 'new' which allows human beings to accomplish something they were not able to accomplish previously." Innovation is born from creativity. Creativity is the ability to think

alternatively useful new ideas. Creativity is a trait that is always looking for new things while innovation is a trait that implements creative solutions.

One that needs to be innovative in the world of education, especially at Hasyim Asy'ari University is the learning media used during the lecture process, especially in educational subjects and basic mathematical concepts that have abstract properties in the material being studied. besides that, the actual facts show that student learning outcomes are still relatively low due to the assumption that mathematics is a very difficult subject (Siregar, 2013). learning media as one of the learning components that can determine the success of a lesson (Falahudin, 2014) The word media comes from the Latin medius which literally means middle, intermediary, or introduction (Azhar, 2015). Heinich and Molenda argue, there are 6 main forms of learning media, namely text, audio media, visual media, motion projection media, miniatures, and humans (Ariyati & Misriati, 2016) Learning using interactive multimedia-based mathematics learning media is feasible to use and can be used as a learning resource for students (Siamy, dkk, 2018). Educational media as a means of improving the quality of education is very important in the learning process. The use of educational media can help the students in the teaching and learning process which in turn can enhance their learning outcomes.

One of the solutions to overcome this problem is to develop learning media assisted by Swishmax 4.0 software. Swishmax is an animation graphic maker program, in which the animation produced is in the form of flash animation (Shodikin, 2017). But besides that, Swishmax can be used to create varied and interesting interactive learning materials in the form of animations with text, images, graphics, and sound easily and quickly (Putra, 2018). Another advantage of Swishmax is that Swishmax can be replayed because the product results can be in the form of a learning video that can be sped up or slowed down or played repeatedly as needed until students understand the material presented. For this reason, the use of Swishmax as a medium in learning mathematics can make the learning process more varied and attract students to be more enthusiastic about learning and can increase students' understanding even better than before using Swishmax learning media. Swishmax learning media has several advantages when compared to other media, including 1) smooth image animation and vibrant colors; 2) equipped with a symbol in the form of a button which can be set using a script as desired; 3) Can display media in the form of audio, visual or audio-visual such as images, sound, text, and films; 4) It takes a short time to access using a flash player (Macromedia Flash Player); 5) Equipped with various scripts to enter commands and can be run like an application (Fajarwati, 2016; Shodikin, 2017; Masni & Hutabarat, 2019). Swishmax also has advantages in processing interesting scientific information. It is said to be interesting because, in this interactive media, there are navigational features so that

information users can easily get the information they need (Kamaludin, 2013). In addition to the advantages there are several disadvantages that must be considered by Swishmax, namely: 1) Requires certain equipment in delivery, 2) Requires certain abilities in manufacturing, 3) Requires electricity. (Effendi, et al, 2019)

Researchers here are interested in utilizing Swishmax 4.0 software. As for several studies that recommend Swishmax 4.0 media, one of them is research conducted by Sari, et al (2020) which states that Swishmax Assisted Mathematics Learning Media in Group Material and Subgroups are feasible and effective to be used as learning aids. Furthermore, research conducted by Nasution & Farihah (2021) stated that the development of Swish Max learning media in pattern-making subjects was considered appropriate to be used as learning media. Aminah & Haryoto (2018) also confirm that the development of learning media assisted Swishmax 4 to assist students in analyzing physical quantities in straight motion is very feasible to use in learning. Fredy (2014) also states that the Development of Interactive Learning Media using Swishmax-4 in Material Regular circular motion is able to improve the learning achievement of class X high school students

So that this research is expected to be able to provide learning media innovations as a tool for lecturers to carry out the learning process more interesting and able to facilitate the contents of the message to be conveyed to students. Based on this explanation, the researcher developed learning media using Swishmax 4.0 as an effective learning medium used during the assessment process.

METHOD

Types of Research

This type of research uses research and development methods (Research and Development). In this study, researchers used the ADDIE research model developed by Dick and Carry (Branch, 2009; Komarudin & Thahir, 2019). ADDIE is an abbreviation that refers to the main processes of the development process, namely: Analysis, Design, Development, Implementation, and Evaluation (Vejvodova, 2015). The stages of research and development are shown in Figure 1.
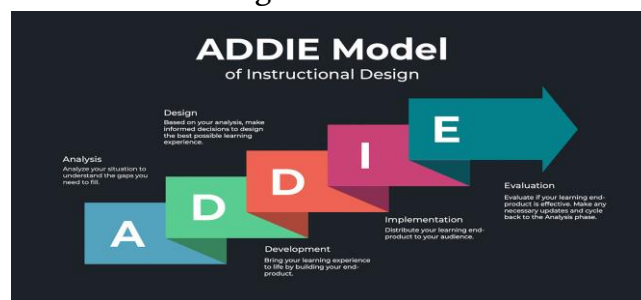

Figure 1.1 ADDIE Research and Development Stages

Iesyah Rodliyah[1], Claudya Zahrani Susilo[2,] Novia Dwi Rahmawati
Swishmax 4.0, Pendidikan dan Konsep Dasar Matematika

Research Subjects

The subjects of this study were students of Elementary School Teacher Education, Faculty of Education at Hasyim Asy'ari Tebuireng University, Jombang.

Data Collection Techniques and Tools

The factors studied were the results of development, the feasibility of learning media products, student responses and learning outcomes. Data obtained by questionnaire method, interviews and tests. The tests in this study were carried out offline (conditional). The data analysis techniques are testing the validity of the instrument conducted by media experts and material experts, analyzing student responses, testing the validity of the items, testing the reliability of the questions, and testing the differentiating power of the questions.

Data analysis

1) Instrument Validity Analysis

The validator writes an assessment on each validation sheet for the results of the program/evaluation tool that has been developed. The assessment consists of five categories, namely: not good (score 1), not good (score 2), quite good (score 3), good (score 4), and very good (score 5). Evaluation program assessment is carried out by media expert validators and material experts. The program is said to be valid if each component of the learning device gets a good enough minimum category (grade 3).

2) Student Response Analysis

Student's response collected through a questionnaire then are analyzed based on percentages. The percentage of each response is calculated by means of the number of student responses for each aspect that appears divided by the total number of students then multiplied by 100%. The student response is positive if the percentage of student answers for each aspect is in the positive category (happy, interested, interested and clear) at least 80%.

3) Analysis of the test items is carried out to get input in revising the test:

a. Validity

A test is said to be valid if the test measures students' abilities in learning according to the stated objectives. Arikunto (2011: 76) states that a test is said to have high validity if the scores on the items are aligned with the total score. This alignment can be interpreted by correlation so that to determine the validity of the items, the product moment correlation formula is used. In this study, an item is declared valid if the validation coefficient is interpreted to be at least sufficient and items that have a low maximum validation will be revised.

Iesyah Rodliyah[1], Claudya Zahrani Susilo[2,] Novia Dwi Rahmawati
Swishmax 4.0, Pendidikan dan Konsep Dasar Matematika

b. Reliability

Test reliability is calculated to determine the consistency of test results. The reliability coefficient of a test can be measured using the alpha formula.

RESULT AND DISCUSSION

Analysis

Innovation is something that is really needed, especially in the world of education, including at the university level. At Hasyim Asy'ari University itself, to be precise in the elementary school teacher education study program, it is necessary to innovate in the lecture process, especially in education courses and basic concepts of mathematics. In this course, students are faced with material that has abstract characteristics. So that to make it easier for students to understand the material properly, it is necessary to innovate using interesting learning media that are able to convey material better. One of them is the researcher utilizing swishmax 4.0 learning media.

Design

The initial product design begins with making an outline related to the material to be discussed and packaged in the software as well as a number of 5 questions related to material in educational courses and basic concepts of mathematics. Questions that have been made are also packed into swishmax 4.0 at the end of the material. Questions can only be done once.

Development

This stage begins with the development of instruments in the form of materials and student learning outcomes tests 5 questions in the form of multiple choice totaling 5 questions and packaged in the SWISHMAX 4.0 Software application.
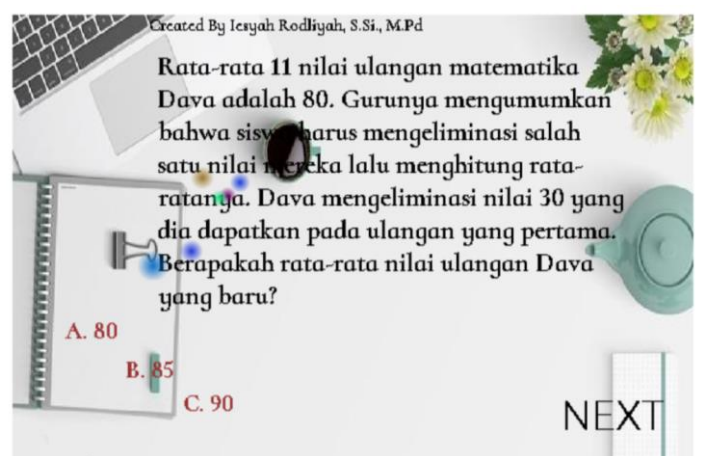

Figure 2. Screen display of Learning Media Using Swishmax 4.0

Before being packaged into swishmax 4.0 media, the instrument was validated by a material expert validator. After receiving input and revisions were made. The instrument is packed into swisxmax media. The media that

Iesyah Rodliyah[1], Claudya Zahrani Susilo[2,] Novia Dwi Rahmawati
Swishmax 4.0, Pendidikan dan Konsep Dasar Matematika

has been developed is then validated by a media expert validator. The instruments developed are in the form of lecture material and questions that will be used to conduct assessments. The questions are taken from educational lecture material and the basic concepts of mathematics.

Instrument Validity Data Analysis

Based on the validation results from media and material experts, it can be seen that the feasibility of Swishmax 4.0 media is known. The results of instrument validation can be seen in the following table:

Media Expert Validation Results

Table 1. Results of Media Expert Validator Assessment

Aspect	Validator Assessment	Maximum Value	Average	Category
General	19	20	4.75	Good
Manipulation Software	12	15	4	Good
Visual Communication	26	30	4.33	Good
Media Design	34	35	4.857	Good
Total Average			4.485	Good
Appropriateness			Worth using with small revision	

Based on Table 1 it can be concluded that the product developed based on the Media Expert's assessment is said to be valid. This is because the assessment given by the media expert validator shows a total average of 4.485, which means the product is in a good category.

Material Expert Validation Results

Table 2. Results of Material Expert Validator Assessment

Aspect	Validator Assesment	Maximum Value	Average	Category
Format	10	10	5	Very Good
Contents	19	20	4.75	Good
Language	34	35	4.85	Good
Total Average			4.867	Good
Appropriateness		Worth using with small revision		

Based on Table 2 confirms that the product developed based on the material expert's assessment is said to be valid. This is because the assessment given by the material expert validator shows a total average of 4.867, which means that the product is in a good category.

Based on the assessment of the validator by media experts and material experts, it can be seen that the overall validator's assessment is valid. The test instrument packaged in swishmax 4.0 software is ready to use after several revisions were made based on comments and suggestions for improvement from the validator.

Implementation

At this stage, limited class trials and main class trials were carried out. Limited class trials were conducted to test the analysis of the test items that

had been made. At the time of the limited class trial, the researcher gave 5 multiple-choice questions which would later be tested for validity, reliability, and sensitivity. From the results of the limited class trial, 8 questions were provided and tested using a validity test, only 5 questions were declared valid. So that the reliability and sensitivity tests are seen from only 5 questions that have been proven valid.

Analysis of Test Items on the Instrument

Validity

A test is said to be valid if the test measures students' abilities in learning according to the stated objectives. Arikunto (2011: 76) states that a test is said to have high validity if the scores on the items are aligned with the total score. This alignment can be interpreted by correlation so that to determine the validity of the items, the product-moment correlation formula is used. (Hobri, 2010:49).

Calculate the validity of each test item using the product moment correlation formula. Of the 8 questions given to students in the trial class, 5 questions were declared valid and quite valid, 3 of which were declared invalid. So the questions used in the main class are only 5 multiple-choice questions. The following is a table of the results of calculating the validity of each item that is declared valid:

Table 3. Value of the Validity of Each Test Item which is declared valid

Question Number	r_{xy}	Criteria
1	0.670	Valid
2	0.537	Valid
3	0.515	Valid
4	0.563	Valid
5	0.530	Valid

Reliability

From the results of reliability calculations using SPSS on 5 questions that were declared valid, the test reliability coefficient $\alpha = 0.448$ was obtained. This means that the learning outcomes test is quite reliable.

Sensitivity

Based on the sensitivity formula for 5 questions that were declared valid, the sensitivity values for each test item were obtained as follows:

Table 4. Sensitivity Value of Each Test Item

Question Number	r_{xy}	Criteria
1	0,347	Sensitive
2	0,826	Sensitive
3	0,300	Sensitive
4	0,304	Sensitive
5	0,652	Sensitive

From the results in Table 4 it appears that each test item is sensitive to learning. Therefore, each item of learning outcomes test is considered feasible.

Iesyah Rodliyah[1], Claudya Zahrani Susilo[2,] Novia Dwi Rahmawati
Swishmax 4.0, Pendidikan dan Konsep Dasar Matematika

After analyzing the test items, the test instruments developed using the Swishmax 4.0 application are ready to be implemented in the main class.

Evaluation

At this evaluation stage, it is used to evaluate the results of products that have been developed and tested. Feedback and suggestions from product users are made for product improvement. The input given by product users includes a number of typo words that must be corrected. In addition to testing product validity, practicality, and effectiveness analysis was also carried out after the product was tested on the main class.

Instrument Practicality Data Analysis

The practicality of statistical learning outcomes evaluation tests packaged in Swishmax 4.0 software in this study is based on data from student assessment results after using the product.

Student Assessment Results

The results of the student assessment carried out on the main trial subjects were mathematics education students who took education courses and basic concepts of mathematics as many as 23 students. After being tested, the students were asked to provide an assessment related to the product that had been developed. The following are the results of student assessments after using the product:

Table 5. Student Assessment Results

Aspek	Percentage of Positive Responses	Percentage of Negative Responses
Student Responses to Swishmax 4.0 Software	97.825%	2.175%
Student Responses to Swishmax Media that have been developed and used during lectures	93.5%	6.5%
Student Responses to the Material and Questions Given	92.4%	7.6%
Student Responses to Lecturers During the Learning Process and Evaluation Process	95.65%	4.35%
Student interest in carrying out learning using Swishmax media again	100%	0%

Based on Table 5 it can be concluded that the results of student assessments of product components that have been developed are at a positive value, this is due to the positive assessment of students who achieve scores > 80%. In addition, students have a high interest in using Swishmax 4.0, this is shown in the aspect of user response to the sustainability of using Swishmax 4.0 software, that 100% of students are interested in using the product again.

Thus, based on the results of student assessments that are positive (greater than 80%), this media product can be said to be practical to use.

Instrument Effectiveness Data Analysis

The effectiveness of the test instruments packaged in the developed Swishmax software is measured based on the value of student learning outcomes both individually and classically. The test is arranged based on the test grid in the RPS. The test results showed that the average score obtained by students was 80.00 and as many as 23 students reached the specified minimum level of completeness and four students did not meet the completeness criteria. The percentage of classical completeness is 78.26%. It can be said that the developed test instrument is effective because the percentage of classical completeness has exceeded 75%.

Based on the ADDIE development model and the tests that have been carried out using validity tests, practice tests, and effectiveness tests, it can be stated that the products developed have been declared valid, practical, and effective. This finding is in line with research conducted by Charissudin, et al (2021) that mathematics learning media with animation using the Swishmax application is feasible and interesting to use in learning in the classroom. Ratnawati and Fitri (2020) also added that learning multimedia products with the SwiSHmax application on circle topics is considered valid and practical as mathematics learning media to train students' conceptual understanding abilities on circle subject matter. Wulandari & Afghohani (2015) also corroborated this statement based on the results of their research that the use of Flash Swishmax as a learning medium can improve student learning achievement.

CONCLUSIONS AND SUGGESTIONS

Based on the results of the study, it can be concluded that expert validation of the learning media developed is in the category of "valid" or suitable to use. In addition, student responses to the learning media developed were good. The results of the effectiveness based on the learning outcomes are included in the effective category, while the results of the practicality test based on the questionnaire show that the media is practical to use.

Suggestions for further research are to utilize Swishmax 4.0 software in developing learning media for other subjects and use collaborative questions in the form of essay questions and multiple-choice questions to develop evaluation tools with Swishmax 4.0 media.

REFERENCES

Aminah, A.N., & Haryoto, D. (2018). *Pengembangan Media Pembelajaran Berbantuan Swishmax 4 Untuk Membantu Siswa Dalam Menganalisis*

Iesyah Rodliyah[1], Claudya Zahrani Susilo[2,] Novia Dwi Rahmawati
Swishmax 4.0, Pendidikan dan Konsep Dasar Matematika

Besaran - Besaran Fisis Pada Gerak Lurus. JRPF (Jurnal Riset Pendidikan Fisika), 3(2), 20-26

Arikunto, S. (2011). *Dasar-Dasar Evaluasi Pendidikan*. Jakarta: Bumi Aksara

Ariyati, S., & Misriati, T. (2016). *Perancangan Animasi Interaktif Pembelajaran Asmaul Husna*. Jurnal Teknik Komputer, 2(1), 116–121.

Azhar, A. (2015). *Media Pembelajaran, Jakarta*: PT Raja Grafindo Persada.

Branch, R. M. (2009). *Instructional Design: The ADDIE Approach.* Springer Science & Business Media (Vol. 722).

Charissudin, A. C. (2021). *Pengembangan Media Pembelajaran Matematika dengan Animasi Menggunakan Aplikasi Swishmax.* Square: Journal of Mathematics and Mathematics Education, 3(1).

Efendi, M., Mardiah, A., & Despi, R. (2019). *Pengembangan Media Pembelajaran Ilmu Pengetahuan Alam Dengan Swishmax Di Min 2 Palembang*. Al- Muddarris: Journal Of Education, 191.

Fajarwati, S. (2016). *Media Pembelajaran Animasi Swishmax Sebagai Alternatif Untuk Siswa Sd Yang Berkesulitan Belajar Pada Materi Bangun Ruang.* Probisnis, 9 (1).

Falahudin, I. (2014). *Pemanfaatan Media Dalam Pembelajaran*. Jurnal Lingkar Widyaiswara, 1(4), 104– 117

Fredy, B. (2014). *Pengembangan Media Pembelajaran Interaktif Menggunakan Swishmax-4 pada Materi Gerak Melingkar Beraturan untuk Meningkatkan Prestasi Belajar Siswa SMA Kelas X*. Jurnal Pendidik Fis. Univ. Negeri Malang, vol. 3, 2014.

Hobri. (2010). *Metodologi Penelitian Pengembangan (Aplikasi Pada Penelitian PendidikanMatematika)*. Jember : Pena Salsabila

Kamaludin, K. (2013). *Mengolah Informasi dalam Media Interaktif Menggunakan Aplikasi Swishmax*. Jurnal Dokumentasi Dan Informasi, 34(1), 85–104.

Komarudin, Arsita, E., Budiman, H., & Puspita, L. (2022). *Media Interaktif Berbantuan Swishmax-4: Desain Dan Implementasinya Dalam Pembelajaran*. Jurnal Pendidikan Sains dan Matematika, 10 (1), 35-44

Komarudin, K., Pahrudin, A., & Nurmalia, V. (2021). *Pengembangan Media Pembelajaran Interaktif Berbantuan Swishmax-4 pada Materi Lingkaran.* JKPM (Jurnal Kajian Pendidikan Matematika), 6(2): 319-326

Komarudin, K., & Thahir, A. (2019). *Bahan Ajar Berbasis Mathematical Comic: Dampak Terhadap Peningkatan Pemahaman Matematis Peserta Didik*. Jurnal Pendidikan Matematika RAFA, 5(2), 98–110.

Masni, H., & Hutabarat, Z. S. (2019). *Pengembangan Multimedia Pembelajaran Berbasis Lash Animation With Swish Max Siswa Kelas XI SMA Negeri 8 Kota Jambi*. Jurnal Ilmiah Dikdaya, 9(2), 257–268.

Nasution, F.H., & Farihah. (2021). *Pengembangan Media Pembelajaran Swish Max Pada Pembuatan Macam – Macam Pola Lengan Siswa Kelas X Smk Negeri 1 Stabat*. Jurnal Pendidikan Tata Busana, 1 (2), 1-7

Putra, F. G. (2018). *Pengembangan Media Pembelajaran Berbantuan Software Swishmax pada Bahasan Bangun Ruang Sisi Datar*. AKSIOMA: Jurnal Matematika dan Pendidikan Matematika, 9(2), 72–83.

Ratnawati, D., & Fitri, A. (2020). *Pengembangan Multimedia Pembelajaran Matematika Dengan Swishmax*. Jurnal Inovasi Pendidikan Matematika (JIPM), 2(1), 32–40.

Sari, R.U., Farida, Andriani, S., & Anggoro, B.S. (2020). *Swishmax Dalam Pengembangan Media Pembelajaran Struktur Aljabar*. Jurnal Pijar MIPA, 15 (3): 280-287

Shodikin, A. (2017). *Pengembangan Bahan Ajar Kalkulus Integral Berbasis Animasi*. Aksioma: Jurnal Program Studi Pendidikan Matematika, 6(1), 1–11.

Siamy, Lailatul, Farida, and Syazali, M.(2018). *Media Belajar Matematika Berbasis Multimedia Interaktif Dengan Pendekatan Contextual Teaching and Learning*. Desimal: Jurnal Matematika, 1, 113–17

Siregar, S. (2013). *Meningkatkan Pemahaman dan Hasil Belajar Siswa Pada Mata Pelajaran Matematika dengan Menggunakan Software Graphmatica*. Edumatica: Jurnal Pendidikan Matematika, 3(01).

Vejvodova, J. (2015). *The ADDIE model: Dead or alive*. Department of Czech Language and Literature, Institute of Lifelong Learning, University of West Bohemia.

Wulandari, A. A., & Afghohani, A. (2015). *Penggunaan Flash Swishmax Sebagai Media Pembelajaran Statistika Matematika I*. Magistra, 26 (94)