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Edmodo-Based E-Learning Media for Middle School Students on Sequences and Series

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Abstract

This research aims to develop an Edmodo-based e-learning media integrated with Macromedia Flash 08 for middle school students on sequences and series. The development of this media used a 3-D model (Define, Design, Develop) and focused on assessing the resulting product's validity, practicality, and effectiveness. Validation results showed that the developed learning media were highly valid, with a validity score of 4.68 from media experts and 4.62 from material experts. Regarding practicality, this media was deemed easy to use by teachers (score 4.53) and students (score 4.48). The media's effectiveness was also evident in the student learning achievement rate of 95% and the average positive student response rate of 89%. This learning media increased student interest and motivation in learning mathematics and made learning more engaging and interactive. However, there are challenges such as internet connection stability and the time required to access materials through Edmodo and Macromedia Flash. Overall, Edmodo-based e-learning media combined with Macromedia Flash 08 is a suitable alternative to support mathematics learning in the digital age.

Keywords: Learning Media, E-Learning, Edmodo

INTRODUCTION

In the era of globalization (Rusmansyah, 2024; Ulfa, 2023)Technology has the potential to replace many traditional practices, given that we have now entered the era of Industry 4.0, which offers convenience and extensive knowledge. (Sangka, 2024; Susilawati, 2024; Thi, 2023). It is undeniable that information and communication technology dominate all fields. (Babuta et al., 2023; Chopra, Avhad, & Jaju, 2020).

Education is one area that is inextricably linked to technology. This demands that everyone be technologically literate. (Dzulfikar, 2023; Thi, 2023; Ulfa, 2023). Information and communication technology, including objectives, influence nearly all components of education. (Thi, 2023), materials (Farman, 2020)strategies, learning content, and resources (Pangesti, 2024), media (Anisa, 2024), and learning evaluation (Kusnanto, 2020). To achieve learning objectives, supporting media are needed to facilitate material delivery.

Referring to the Process Standards (Minister of National Education Regulation No. 65 of 2013), the learning process in educational units is conducted interactively, inspiringly, and fun, challenging, motivating students to participate actively, and providing sufficient space for student initiative, creativity, and independence. This implies that teachers are expected to make learning more innovative, encouraging students to learn optimally independently and in the classroom. With the advancement of technology, researchers believe that internet-based learning media is the most appropriate medium, as almost all educators use the internet.

Mathematics is a subject in education, one of which is mathematics. Mathematics offers a wide range of topics to learn. However, based on observations and interviews conducted by researchers, many students still dislike mathematics. Students struggle with memorizing formulas and understanding mathematics lessons.

Many teachers still use media and teaching aids that discourage students from engaging in learning activities. Furthermore, the limited time available does not match the number of competencies students must master. One difficult mathematics topic for most students to master is sequences and series. Sequences and series are among the mathematics subjects taught at the vocational high school level.

Based on the discussion above, researchers want to develop an Edmodo-based e-learning platform that combines interactive learning media with the help of the Macromedia Flash 08 application. This aims to make learning more enjoyable and help students understand the material more easily. Kuntarto (Supriyo & Afifah, 2022) Edmodo is a social media platform often described as a Facebook for schools and can serve many more purposes depending on needs.

Meanwhile, Luvita (Komariah, Suhendri, & Hakim, 2018) Stated that Edmodo is a social network that has proven to be very helpful for teachers and students in the teaching and learning process. A platform with various features that support the learning process, such as poll, gradebook, quiz, files and links, library, assignment, award badge, parent code, and others that make learning more effective, efficient, and organized, especially in this study, will be combined with interactive learning media, namely Macromedia Flash 08.

Ardinsyah (2013) revealed that Macromedia flash software is an application that operates for graphic design and 2-dimensional animation on computer operations can be used as a learning aid with various media components such as video, images, text, animation, and sound so that learning becomes more interactive, this opinion is supported by Liberna and Nusantari (2018) who said that by using this media, students can directly see simulations and demonstrations that resemble actual events making it easier for students to reason and understand sequences and series. The reasons described above are the factors behind the researcher's decision to conduct a study entitled "Development of Edmodo-Based E-Learning Learning with a combination of Macromedia Flash 8 on the subject of Sequences and Series".

METHOD

This research used a Research and Development (R&D) method with the ADDIE (Analysis, Design, Development, Implementation, Evaluation) development model approach, which is considered more comprehensive and systematic in producing and testing Edmodo-based e-learning media on the topic of sequences and series for secondary school students.

1. Analysis Stage: In this stage (Nugraha, Hidayat, & Madawistama, 2023; Saputra, Cahyati, & Khairita, 2023)A needs analysis was conducted through interviews and questionnaires with teachers and students to identify problems in learning sequences and series and the potential use of Edmodo as a learning medium. Curriculum and student characteristics were also analyzed to ensure the developed media aligns with learning needs.
2. Design Stage: The learning media was designed by designing the learning flow, interactive features on Edmodo (such as discussion forums, online quizzes, and digital assignments), and compiling sequence and series material in an attractive and easy-to-understand manner. This stage also included the creation of a storyboard and an initial prototype of the media.
3. Development Stage: Media development was carried out by integrating sequence and series material into the Edmodo platform, including the creation of digital content (Agustien, Umamah, & Sumarno, 2018; Shesilya & Aloysius, 2023)learning videos, practice exercises, and other interactive features. Media experts and subject matter experts carried out validation to assess the product's validity. Revisions were made based on input from the validators.
4. Implementation Stage: The validated learning media were trialed on a limited basis with high school students (Shesilya & Aloysius, 2023; Turnbull, 2023). Teachers and students received brief training on using Edmodo. During implementation, observations were made of the learning process, and practicality data were collected through questionnaires for teachers and students.
5. Evaluation Stage: Evaluation was conducted to measure the effectiveness of the learning media through learning outcome tests (pretest and posttest) and student response questionnaires. The data obtained were analyzed descriptively and quantitatively to assess the media's validity, practicality, and effectiveness.

The subjects of this study included expert validators, mathematics lecturers and media experts, as well as mathematics teachers and high school students who participated in the limited trial. The instruments used in this research included several essential tools, such as a validation sheet to ensure the suitability and accuracy of the material, a practicality questionnaire to assess the ease of use and applicability of the material in learning, and an implementation observation sheet to help monitor the extent to which the material was effectively implemented in the classroom.

Furthermore, a learning outcome test was conducted to measure student understanding of the material. (Shesilya & Aloysius, 2023)A student response questionnaire was used to obtain direct feedback from students regarding their learning experiences (Li, 2024). These instruments were designed to provide a comprehensive overview of the effectiveness and efficiency of the materials developed to improve the quality of mathematics learning in secondary schools. By involving various competent parties, this research is expected to significantly contribute to developing more innovative teaching methods tailored to student needs.

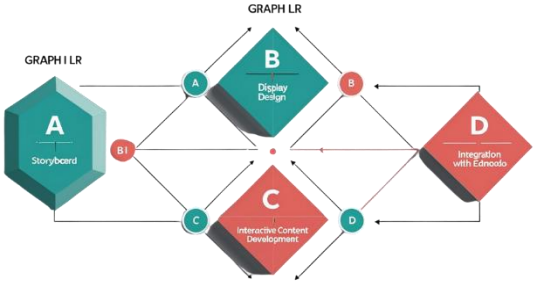
Validity, practicality, and effectiveness data were analyzed using quantitative descriptive techniques with established assessment criteria. The results were used to determine the feasibility of Edmodo-based e-learning media for sequences and series. By using the ADDIE model, this research is expected to produce learning media that are valid and practical and effective in improving student understanding and motivation in sequences and series.

Results and Discussion

Research result

1. Results of the Definition Stage

stage (Soraya, 2022)Researchers identify main problem in learning mathematics (Rabiman, 2024)especially in the material sequences and series, namely, low interest Study students and a lack of interactive



a. Identification Problems and Analysis Needed (Crompton, 2024)At this media.

Figure 1. Analysis Flowchart Need

2. Results of the Design Stage: Media Design and Storyboard

At the stage design, this researcher creates storyboards and designs learning media interactively using integrated Macromedia Flash 08 on the Edmodo platform. The design process aims to produce interesting, interactive, and easy learning media accessible to students through the Edmodo Learning Management System (LMS).

Figure 2 Media Design Flowchart

At an early stage, researchers create a storyboard that includes scenario learning, sequence display, as well as channel interaction between students and media. This storyboard is the main reference for development appearance and content interactive at the stage.

Based on the storyboard, the design visual display of media is done, includes page layout, selection palette color, typography, and placement of element graphics. For the Power pull, added illustration character students who use laptops or tablets, so this media felt more relevant to daily life for students.

At this stage, content learning is designed in an interactive way using Macromedia Flash 08, and several Interactive features that can make the quiz interactive with knob choice answers, animation to explain materials, as well as navigation between pages with next/prev buttons. In addition, the feed comes back directly for answering students are also provided. Development element interactive. This is done using ActionScript, which allows for manufacturing logic quizzes, tracking scores, and responsive animations.

After finishing the content interaction, the next steps are to integrate media into Edmodo. You can upload SWF (Flash) files directly to Edmodo or use the embed/ iframe feature for linking media, depending on the platform's support. If necessary, you can utilize the Edmodo API to manage interactions with users and report results learning. Please note that the use of Flash has limitations in modern browsers, so it is highly recommended for testing compatibility or consider conversion to a more modern format if required.

To increase the Power visual appeal, this media is equipped with an illustration character. Students using laptops or tablets. Illustrations can be made with a follow guide design digital characters, such as using device soft design graphics, such as Clip Studio Paint or Adobe Illustrator, as well as notice expression face, natural pose, and relevant attributes like uniform school, desk learning, and digital devices. In addition, it is essential to adapt the style of illustration with group age students to be more interesting.

3. Results of the Development Phase

Activities at this stage include expert assessment and field trials—presentation and analysis of data from the trial of Edmodo-based *e- learning* combined with Macromedia. Flash 8 consists of data from validity, practicality, and effectiveness tests. Validity test data were obtained from validation sheets from experts, of which there were two in this study: mathematics lecturers from STKIP PGRI Pasuruan and grade XI mathematics teachers from SMK PGRI 4 Pasuruan. Practicality test data were obtained from implementation observation sheets, including student and teacher observation sheets in this study. Effectiveness tests were obtained from evaluation test results and student responses.

Validity Test Results

Media used in learning has been validated by experts to ensure quality and effectiveness. Based on the assessment carried out, media experts provide a score of 4.68, which shows that the media is considered valid and meets the standard required qualities for use in the learning process. This score shows that the media has been designed with good, interesting, and appropriate content for users. While that expert material gives a score of 4.62, which also indicates a valid status. This signifies that the material presented in the media is relevant, accurate, and can support the achievement of learning objectives that have been determined. With validation, this will be a learning medium that can be used optimally in the learning process teaching, giving experience effective and enjoyable learning for students. Validation by both experts ensures that the media and materials used are reliable and useful in supporting the educational process.

Table 1. Validation Results:

Validator	Validity Score
Media Expert	4.68
Subject Matter Expert	4.62

Practicality Test Results: The Practicality test has been implemented by teachers and students, with results that show a high level of practicality. Assessment from the teacher shows a score of 4.53, which is categorized as " Practical ", while evaluation from the student gets a score of 4.48, also in the " Practical " category. These results indicate that both teachers and students feel that the method or the tool being tested is easy to use and effective in supporting the learning process.

Table 2. Practicality Results Table :

Respondents	Practical Score

Teacher	4.53
Student	4.48

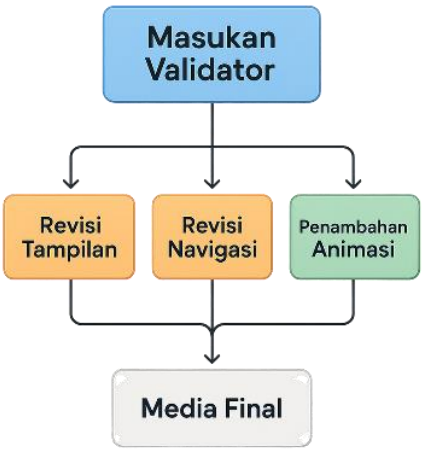
Effectiveness Test Results: The effectiveness of learning media can be measured through two main aspects: completeness quiz and response students. Based on the results obtained, the completeness quiz reached 95%, indicating that a large number of students succeed in understanding the material presented. In addition, the response to the use of learning media is very good, with a level of satisfaction of 89%. This indicates that the media is not only effective in conveying material, but also liked by students because it can increase their understanding in a significant way.

Table 3. Effectiveness Results Table :

Indicator	Percentage
Quiz Completion	95%
Response Student	89%

3.4. Revision Process Product

After validation and testing, we revise the media display with add instruction usage, simplify access material on Edmodo, and add animation interactive.



Picture 3. Product Revision Diagram

DISCUSSION

Analysis results show that this media is valid, practical, and effective. Success. This supported by the integration feature, interactive as well as convenient access via Edmodo (Hertiavi, 2020; Janfeshan, 2022).

Research result This is in line with studies previously shown that the use of Edmodo-based e-learning can increase motivation and results. Study mathematics (Nur Septi Aqmarina, Hamidah Nayati Utami et al., 2020). This is supported by various research that states that e-learning platforms like Edmodo provide convenient access and flexible time learning, which in turn increases student involvement. In addition, the features the interactive features available on Edmodo allow student For communicate and discuss with more effective, so that help understanding material in a way more in-depth (Duwi Novitasari, Triani Ratnawuri, 2019; Hamka & Effendi, 2019; Man, 2023).

Other studies also reveal that the use of Edmodo can create environment learn more fun and interesting for students s, of course impact positive on motivation Study they (Marfuah, 2016; Rachmawati, Wijayanti, & ..., 2020). With Thus, the results study This strengthen findings previously about benefits of Edmodo -based e-learning in context learning mathematics, as well as highlight potential this platform is big for increase quality education in a way overall. Conformity between study This and other studies show that Edmodo is effective tool in increase motivation and results learn, make it good choice for institutions education that you want optimize the learning process through technology (Karimah, Utami, & Hidayah, 2018; Man, 2023; Zain, 2023).

Implications from results study This show that the media developed can become alternative learning innovative and relevant mathematics in the digital age. The media not only offers new methods to teach mathematical concepts, but also is able to increase student motivation by providing a more interactive and interesting approach. By utilising digital technology , this media can be accessed easily by students in various places and at various times, making it a flexible tool in the learning process. In addition, this media can also be integrated with existing curriculum, so that it makes it easier for teachers to convey material lessons in a more effective way (Habibah, Salsabila, Lestari, Andaresta, & Yulianingsih, 2020; Hamka & Effendi, 2019; Priambodo & Nuryanto, 2020). The use of this media is expected to increase students ' understanding of mathematical material and grow their interest in learn field. This will continue. Thus, this media potential become solution practical learning in modern education.

Study this own a number of necessary limitations . In technical, research This experience constraint in the form of internet network that is not stable that can disrupt the data collection process and time access quite old material, so that slow down channel research. In addition, from development model aspect, research only reached the development stage and not yet reach disseminate stage, which means results study Not yet can disseminated or implemented in a way area. Limitations: This gives a challenge alone in reaching optimal research results and requires a team of researchers to look for alternative solutions to minimize the impact of existing obstacles .

The need for training. The use of Edmodo for teachers and students is very important. To increase proficiency in using this platform. Research continuation is also a must, involving disseminate and expand stages, to get more comprehensive data. In addition, media development that uses more modern technology and more access is also necessary to be considered so that users can utilise the full potential technology. The third integration element This can increase the effectiveness of the learning and teaching process in the digital era (Hertiavi, 2020; Nur Ika Amalia, Yuniawatika, 2020; Wijaya & Santoso, 2022).

CONCLUSION

Based on research results, it can be concluded that a learning mathematics-based approach, with learning media assistance, has a significant and positive impact on improving concentration and memory in students at school. Use of learning media in a constructivist approach not only creates a learning process more engaging and interactive learning process, but also stimulates cognitive abilities of students to understand mathematical concepts more deeply.

The constructivist approach allows students to participate actively in the learning process, so they can build understanding on their own through experience and interaction. This is different from the traditional approach, which tends to be passive and less involving the student in the process of solving problems. Using appropriate learning media allows students to easily understand materials and information remembering what has happened studied.

Implications from the study. This is that the teacher at school needs to consider an integrated approach that incorporates constructivist and learning media in teaching mathematics. This will help create environment learn more inclusive and supportive development cognitive all students, including those who have special needs. Thus, it is hoped that quality learning mathematics at school, including can continue to increase, giving more opportunities, which is Good for every student, to reach their potential maximum.

CONCLUSION

Based on the results of validity, practicality, and effectiveness discussed previously, learning media e-learning has been declared valid, practical, and effective. Learning *e-learning* based *Edmodo* combined with *Macromedia Flash* 8 can provide support in the learning process of teaching . However, it is necessary noticed that connection internet network must stable and device support like computer must Already available .

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