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Development of Edmodo Media with Learning Videos to Improve Understanding and Mathematical Resilience on Derivative Material

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ABSTRACT

The low participation of students in online interactive learning was due to the inappropriate use of media and online learning designs. In these conditions, it is necessary to use media that can facilitate the online learning process optimally. This study aimed to compile and obtain video-assisted Edmodo media on valid, practical, and effective derivative materials for class XI students. Video-assisted Edmodo media was chosen to improve students' mathematical understanding and resilience. This media development was developed using the ADDIE model, which consisted of several steps: analysis, design, development, implementation, and evaluation. This research and development subjects were senior high school students of class XI in Kendari. The data collection instrument in this study consisted of a validation sheet, a questionnaire, and a test. The validation results of material and media experts showed that the design of the developed learning material video was in very valid criteria. The analysis of student response data showed that the average score of students' responses to the learning process, learning videos, and student worksheets was positive. The analysis of mathematical understanding and resilience showed that the average of students' understanding ability was in the high category and the students' mathematical reliability was in the high category too. Thus, the Edmodo video media for learning mathematics for functional derivatives met the criteria (valid, practical, and effective) in improving students' mathematical understanding and resilience.

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1. INTRODUCTION

The development of information and communication technology in the industrial era 4.0 has significantly influenced education. One of the information technology that plays a role in the world of education is online learning. Online learning is a form of educational service learning from home during the coronavirus disease (covid-19) emergency (Arbain & Farman, 2021). The implementation of education policies during the covid-19 emergency period was to fulfil students' rights to obtain educational services during the covid-19 emergency. The implementation was carried out through offline or online learning from home.

However, the phenomenon of learning from home carried out during covid-19 was beyond expectation. Based on a survey conducted by the Ministry of Education and Culture, it was found that the majority of students had difficulty understanding the lesson, with details of the difficulty in understanding the lesson reaching 69.1% of students, 52.7% of students lacking concentration, and 54.0% of students feeling bored with the learning carried out by teachers. This was due to the way of students study from home, and the students got used to doing online assignments from teachers (86.6%) than having interactive online learning with teachers (38.8%) (Muhammad, 2020). The low participation of students in online interactive learning was due to the inappropriate use of media and online learning designs. This was in line with the conditions at SMA Negeri 8 Kendari, where WhatsApp groups dominated the learning activities. This study was a suitable solution because it was easy to use and accessible to teachers and students. However, this did not provide a touch of innovation, and supports interactive learning (resilience) and student interest in online learning. This, of course, impacts students' common mathematical understanding of their lessons, especially mathematics. One material that is still considered so difficult by high school students is the derivative function (Fatmanissa et al., 2019).

This calls for the use of well-suited material to ease the burden of online education. The learning processes of students are profoundly affected by the variety of learning media available to them, especially in light of recent technological advancements. Computer media, video, radio, television, powerpoints, and photographs are just some examples of the many types of learning media available. Good, usable learning materials will aid students in accomplishing their educational goals. (Eleanor et al., 2019). The Learning Management System (LMS) is a tool for conducting educational activities in a virtual environment. The LMS is an application-based learning management system that operates online. In a learning management system (LMS), students can sign up for an account, manage their information, learn and complete assignments, check their progress and see what they've learned, consult with other students and instructors, and evaluate their own performance. Edmodo is one of the many learning management systems (LMS) used to facilitate distance education.

Edmodo is a social learning platform where students, teachers, and parents can easily collaborate on projects, communicate with one another, and share information (Balasubramanian et al., 2014). Edmodo is one of the most reliable media and is prepared to support learning in the classroom. Users won't have any trouble getting started with Edmodo because it functions similarly to Facebook. (Tavukcu, 2018). Edmodo can solve learning barriers by enabling students to access learning outside the classroom and empowering student-centred learning through various assignments and appropriate learning environments (Mokhtar, 2018). Learning through Edmodo can increase interest in learning mathematics (Trisniawati et al., 2019) and attract students' attention (Alqahtani, 2019). The use of Edmodo in learning facilitates students to increase their conceptual understanding of mathematics with good criteria (Ariani et al., 2017).

To get the most out of Edmodo, try to include instructional videos. Students' cognitive, emotional, and psychomotor skills all benefit from using learning films as learning material. Learning films, as discovered by Wardono et al. (2016), can invigorate pupils and make it simpler for them to retain the information presented by the teacher. Students' interest in learning is piqued through the usage of video, especially in the subject of mathematics. Some students may learn better from seeing a video of a teacher presenting and discussing mathematical concepts, hence it is important and appropriate to

use such films when presenting such concepts. Meanwhile, pupils who struggle with mathematics will have more time to fully comprehend the concepts presented (Korpela, 2015). Mathematical achievement, as well as students' interest in, and capacity for, learning, are all positively affected by the use of instructional videos (Anwar et al., 2020; Lalian, 2018).

Video-assisted online education is a growing trend in the Students' mathematical understanding and perseverance were bolstered by using Edmodo media. Students were able to study mathematics on their own time, in their own environment, and with the help of their own pace, thanks to online learning with video-assisted Edmodo media. The ability to grasp mathematical concepts is crucial for success in the field. Students can learn mathematics if they can manipulate the data in mental models (Hendriana et al., 2017). According to the findings of Cahyani et al. (2018), pupils' resilience correlates with their aptitude in mathematics. In other words, pupils' mathematical comprehension skills will be high if their resilience is high enough, and vice versa. Students who are mathematically resilient have the following characteristics: an adaptive mindset that allows them to face the uncertainty of problems and challenges, solve problems logically and flexibly, seek creative solutions to challenges, are inquisitive, learn from experience, have self-control, are aware of their emotions, and have a strong support system (Hendriana et al., 2017). Therefore, students need mathematical resilience to help them overcome challenges and succeed in mathematics (Ulfah & Muntazhimah, 2020). Edmodo, with video support is a viable and powerful tool for fostering mathematical knowledge and perseverance among students.

This research is essential because online learning based on Edmodo in mathematics is a learning innovation that can provide an atmosphere of adaptation to new learning and self-control (mathematical resilience) and mathematical understanding for students in learning mathematics. In addition to Edmodo, which has various features such as material presentation, discussion forums, evaluation and assessment, videos of mathematics learning materials are also provided that allow learning to be more interactive. Previous studies only examined the use of Edmodo on aspects of understanding, mathematical proof, interests and other mathematical hard and soft skills. In addition to these aspects, it is also necessary to know the mathematical resilience of students, especially in online learning during a pandemic.

2. METHODS

That study was an R&D effort. To develop a product that met certain standards, R&D mainly entailed conducting study. Research and development are prioritized so that instructional materials can be developed that are most likely to be effective in bringing about the intended learning outcomes. The outcome of this research was a legitimate, practical, and effective learning medium on Edmodo for enhancing students' resiliency and mathematical grasp of function derivatives. The ADDIE paradigm was utilized by the team of researchers to create the instructional resources. It was through these five stages—analysis, design, development, implementation, and evaluation—that the final product was created. (Hopkins, 2012). The ADDIE model is one of the most often used models in generating effective designs. The ADDIE model's stages are interconnected and mutually reinforcing (Aldoobie, 2015). Step one in any activity analysis should be determining whether or not the creation of new forms of educational media is necessary. The analytical step consists of observing the school curriculum, student character and the learning process at school and analyzing concepts and theories essential to media development. The design process entails creating both the media and the tool for evaluating learning media. In this stage, we put the learning materials through their paces by putting them through a battery of validity tests and then rebuilding them based on the feedback we received from our expert/validator. In this stage, we tested several different forms of educational media by using them in a classroom setting. The purpose of this phase is to examine the developed media for their usability and efficiency. In the final step, evaluation, the problems encountered during implementation are discussed and the media's viability in light of the desired outcomes is assessed..

The tryout was carried out through expert and practitioner tests as well as field testing. Media experts carry out expert and practitioner tests, and material experts validate and provide input on the initial product. The media and material experts used in this study consisted of two mathematics education lecturers and one mathematics teacher who was a media expert and often taught using the media. The field testing was conducted in the classroom, where the students used the developed learning media. The subjects in this study were senior high school students of class XI in Kendari for the Academic Year of 2021/2022.

The data collection instrument in this study consisted of a validation sheet, a questionnaire, and a test. The validation sheet was used to determine the validity of the learning media, and the questionnaire was used to obtain information on the practicality of learning media and mathematical resilience. Meanwhile, the test was used to determine the effectiveness of the learning media on students' mathematical understanding.

The data obtained in this study will be analyzed quantitatively based on the grouping of design assessment criteria, namely validity, practicality, and effectiveness. Analysis of the validity of the learning media data was carried out to assess the validity of the media. Data analysis of media validation results was carried out by determining the average total validator (ATV) assessment based on each criterion's average and each aspect in the validation sheet. The average total validator assessment was then adjusted according to the established validity category. The validity category are presented in Table 1.

Table 1. Category validity

Interval	Category
$4 \leq ATV < 5$	Very Valid
$4 \leq ATV < 3$	Valid
$3 \leq ATV < 2$	Less Valid
$1 \leq ATV < 2$	Invalid

The media was categorized as valid if the average total validator assessment was at least in the valid category (Farman & Yusryanto, 2018).

Data analysis of the practicality of the design was obtained through a student response questionnaire that measured students' opinions on the design and learning media used. The students' responses are viewed from aspects of the learning process with Edmodo, learning videos, and student worksheets. Student responses in this study consisted of accepting (positive response) or refusing (negative response). For this reason, the range of scores of 0 - 100 is only divided by two, namely $0 < x \leq 50$ and $51 < x \leq 100$. The criteria for student response in learning are determined by (a) If $\overline{S_t} > 50$, then said the second subject gives a positive response, and (b) If $\overline{S_t} \leq 50$, then the subject is said to give a negative response. Learning media was categorized as practical if the average score for all students was positive (Farman et al., 2021).

Data analysis of the effectiveness of the design was measured through a mathematical resilience questionnaire and a test of students' mathematical understanding abilities after the Edmodo-based learning design was used for field testing in the classroom. The data from the conceptual understanding ability test results were analyzed by recapitulating each student's score, calculating each student's conceptual understanding achievement, calculating the average total understanding achievement of all students, and drawing conclusions from the students' understanding ability by adjusting the comprehension ability criteria presented in the table below:

Table 2. Concept Understanding Category

Interval	Category
$85 \leq CU \leq 100$	Very High
$70 \leq CU < 85$	High
$55 \leq CU < 70$	Medium
$40 \leq CU < 55$	Low
$0 \leq CU < 40$	Very Low

Students' mathematical resilience data were analyzed by recapitulating each student's score, calculating the average mathematical resilience obtained by each student, calculating the average total mathematical resilience of all students and making conclusions from students' mathematical resilience by adjusting the criteria given in the table below:

Table 3. Mathematical Resilience Category

Score	Category
$85 \leq MR \leq 100$	Very High
$70 \leq MR < 85$	High
$55 \leq MR < 70$	Medium
$40 \leq MR < 55$	Low
$0 \leq MR < 40$	Very Low

The learning media was categorized as effective if the mathematical resilience was high and the students' mathematical understanding ability was high.

3. FINDINGS AND DISCUSSION

This study aimed to compile and obtain video-assisted Edmodo media on valid, practical, and effective derivative materials for class XI students. Edmodo-based learning media assisted by videos of function derivative materials is carried out through ADDIE design development steps consisting of analysis, design, development, implementation, and evaluation.

Analysis

Analysis activities were conducted through classroom observations and discussions with math teachers in class XI senior high school in Kendari City. Based on the interview with the teacher, it was found our that WhatsApp groups dominated online learning activities. In one of the learning classes the teacher forms a math class group with the name group "Matematika Kelas XIA". This is less effective, and does not provide a touch of innovation, understanding, and mathematical resilience of students in the spirit of online learning. As Nurfaizah et al. (2021) stated, using WhatsApp was less effective in learning mathematics online. This lack of understanding and resilience causes most students to have difficulty solving mathematical problems, one of which was function derivative material. Therefore, to support learning objectives and overcome problems of mathematical resilience and understanding of functional derivative material, the researchers needed to convert the material and competencies that students wanted to achieve into a medium to make students easier to carry out learning activities. The media used in this development were the video-assisted Edmodo application. The use of video in Edmodo can convey information, messages, concerns, and students' willingness to learn.

Design

Preparing resources for derivative functions, including the notion of derivative functions, derivatives of algebraic functions, the monotony of functions, and applications of derivatives and graphs of functions, was the means by which this stage was accomplished. Video versions of the previously prepared materials were produced. The Camtasia program was used to record the presentations made in Powerpoint. The first slide of each instructional video was dedicated to the film's title, the second to the video's goals, the third to a presentation of sample problem materials and solutions, and the fourth to a conclusion and thanks. The video editing interface is shown in the diagram below.

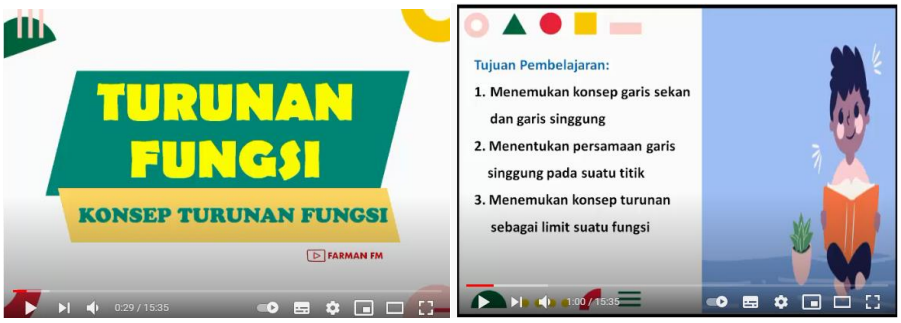

Figure 1. Video Design

Furthermore, the Edmodo class/group was designed as an instructional medium. The Edmodo class was designed with the class name "Mathematics XI_Derived Functions". In the Edmodo class, the provided materials were posted in the form of learning videos, attendance lists, assignments, and learning tests/evaluations. Learning materials were presented in posts based on indicators and learning objectives in student books. Here's the appearance of the Edmodo class design.

Figure 2. Home Design

Figure 2 shows the front page view of Edmodo. At the top is information showing the class name, teacher name, subject, and grade level. In addition, this front page is a page for sharing material the teacher provides to students and sharing attendance, assignments, and evaluations. There can also be discussion interactions between students and teachers on this page.

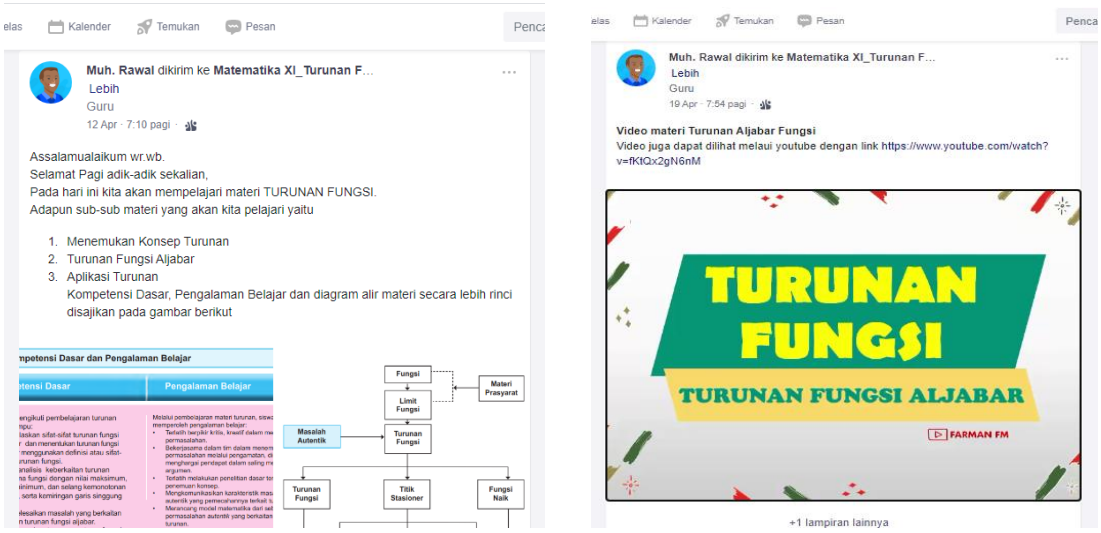

Figure 3. Design of Material Presentation Posts

Presentation of the material provided by the teacher to students can be given in the form of exposure with paragraphs, images, files, or videos of derivative material. In this media, the material in the form of files and videos is stored in a folder. Furthermore, the material is presented at each meeting as an explanation accompanied by a video, as shown in Figure 3.

After designing the developed media, the learning media assessment instruments were also designed. The designed assessment instruments consisted of (1) lesson plan validation sheets, learning videos, Edmodo-based learning media, mathematical resilience questionnaires, and student response questionnaires sheets, a test of concept understanding, (2) mathematical resilience questionnaires, (3) student response questionnaires, and (4) test of conceptual understanding.

Development

The design of learning media and instruments prepared in the design step is then assessed/validated by experts (validators). The designed media that had been developed were then assessed by three validators. The validation was carried out by submitting a validation sheet that had been compiled in the form of a google form. The validators assessed the media by filling out a google form based on the statement on the validation sheet. Product validation results are presented in Table 4.

Table 4. Product Validation Results

Assessment Aspect	Average	Category
Video Learning	4,23	Very Valid
Edmodo-based learning media	4,34	Very Valid
Student Mathematical Resilience Questionnaire	4,59	Very Valid
Student Response Questionnaire	4,56	Very Valid
Test of Concept Understanding	4,17	Very Valid

Table 4 shows that the average validator's assessment of learning videos is 4.23, the Edmodo media assessment is 4.34, the mathematical resilience questionnaire is 4.59, student responses are 4.56, and the concept understanding ability test is 4.17. Thus the media and learning instruments developed to have an average value above a score of 4, which means they are in the very valid category. In providing an assessment, the validators also commented in the suggestion section

provided on the validation sheet. The suggestions were given inputs for revising the deficiencies contained in the developed products. The suggestions include making graphic images on a separate slide so that the image can be enlarged and the writing is more precise and turning up the music volume when there is no material delivery, either at the beginning or at the end of the video session.

Implementation

After revising the products based on the validators' suggestions, the learning media were tested on students. The trial was carried out by implementing the media in classroom learning. These media were used four times in discussion meetings, namely the concept of derivative functions, derivatives of algebraic functions, the monotony of functions, and applications of derivatives and graphs of functions. Finally, before the learning activities started, a pre-test related to function derivatives was carried out.

The learning activities for each meeting begin with students filling out the attendance list prepared in the Edmodo class. The attendance list was given by writing PRESENT on the form with the specified filling time according to what was written on the screen. After filling out the attendance list, it was continued with the delivery of material in the class forum. Learning materials can also be accessed before learning begins. In addition to the materials, the assignments have also been prepared with a published schedule and time for submission. The tasks given to students were in the form of student worksheets and practice questions. Students submitted the assignments using screenshots or photos of the results of their work, and then the assignments were uploaded on the section form provided by the teacher at Edmodo.

After the activities for the Derivatives were completed, the next meeting was evaluating the learning of Derivatives. The evaluation activities were carried out for 2 x 40 minutes. Based on the data analysis of students' conceptual understanding of the Derivative material, the average of students' score was 72, and the number of students who obtained score with high category was 11 students (44%). In summary, the learning outcomes of Derivatives were presented in Table 5.

Table 5. Statistical Data of Understanding the Concept of Derivative Functions

N	Highest Score	Lowest Score	Mean	Standard Deviation	Variants
25	100	25	72	25,81	666,67

The data on students' ability to understand the concept of Edmodo-based learning with video-assisted function derivative materials are shown in Table 6.

Table 6. Data on The Ability to Understand Concepts

Category	Number of Students	Percentage
Very High	11	44%
High	5	20%
Medium	3	12%
Low	2	8%
Very Low	4	16%

In this step, a student resilience questionnaire was also given using a Likert scale. This questionnaire was distributed to students through a google form. Mathematical resilience of students with video-assisted Edmodo-based learning material for derivatives is presented in Table 7.

Table 7. Mathematical Resilience (MR) of students in Edmodo-based learning with video

Score	Category	Total	Percentage
85 ≤ MR ≤ 100	Very High	2	8%
70 ≤ MR < 85	High	12	48%
55 ≤ MR < 70	Medium	11	44%
40 ≤ MR <55	Low	0	0%
0 ≤ MR < 40	Very Low	0	0%

Table 7 shows that two students (8%) have very high resilience, 12 students (48%) have high resilience, and 11 students (44%) have moderate resilience to video-assisted Edmodo-based learning on function derivative materials. Meanwhile, based on the indicators, mathematical resilience is presented in Table 8

Table 8. Categories of Each Student's Mathematical Resilience Indicator

Indicator	Score	Category
Diligent, confident, work hard, and don't give up easily to face problems	75,3	High
Willing to socialize, easy to give help, discuss, and adapt to their environment	68,6	Medium
Have new ideas and find creative solutions to challenges	67,4	Medium
Using the experience of failure to build self-motivation	74,4	High
Shows curiosity, reflects and makes use of various sources	72	High
Have the ability to speak, self-control, and be aware of his feelings	65,4	Medium
Average	71,01	High

Table 8 shows that the students have high categories for indicators of perseverance, self-confidence, hard work, not giving up easily besides using failure experiences to build self-motivation, very high student involvement and showing curiosity, reflecting, and utilizing various sources. While the other three indicators are in the medium category, namely the desire to socialize; easy to provide assistance; discussing; adapted to their environment; having new ideas; finding creative solutions to challenges; having language skills and self-control; and being aware of their feelings. The average mathematical resilience of student learning in the classroom is 71.01, meaning that the mathematical resilience of video-assisted Edmodo-based learning on function derivative materials is high.

Based on the analysis results, students' understanding ability is in the high category and students' mathematical resilience is in the high category. Overall, this shows that the design is included in the effective category.

In addition to a mathematical resilience questionnaire, at this stage, a student response questionnaire was also given to determine the student's response to the use of video-assisted Edmodo-based learning on the developed function derivative material. The results of the analysis of the students' responses are presented in Table 9.

Table 9. Results of Student Response Analysis

Aspects	Total	Average	Class Response
Learning process with edmodo	81,28		
Learning Video	78,09	79,89	Positive
Student Worksheet	80,3		

The analysis of students' response data showed that the average of students' response to the learning process, learning videos, and student worksheets was 79.89, and based on the established criteria, the value was in a positive category (greater than 50).

Evaluation

The results of the data analysis show that the media and instrument designs are in the valid category, which means that video-assisted Edmodo media is feasible to use. Video-assisted Edmodo media design also received positive responses from students, which means that video-assisted Edmodo media are practically used. The results of understanding concepts and mathematical resilience are in the high category, meaning that video-assisted Edmodo media is effectively used to increase conceptual understanding and mathematical resilience. So it was concluded that the results of developing video-assisted Edmodo-based learning designs on function derivative materials met the established criteria, namely valid, practical, and effective. The video-assisted Edmodo-based mathematics learning media has been tested for its feasibility. The media can be used to motivate, facilitate fun interactive learning and support mathematical resilience and understanding of XI grade high school students on function derivative materials. This is in line with several studies that show a positive impact on the use of video-assisted Edmodo, including minimizing boredom in learning (Hadi & Rulviana, 2018), changing students' perceptions of learning mathematics that is less fun to be interesting, activating students and giving a positive influence on using the internet for students (Farman & Chairuddin, 2020) and improving students' understanding of mathematical concepts (Azizah et al., 2018).

4. CONCLUSION

The validation results of material experts and media experts show that the design of the derived material learning video is in very valid criteria. The analysis of students' response data showed that the average of students' response to the learning process, learning videos, and student worksheets was in a positive category. Furthermore, the analysis of mathematical understanding and resilience showed that the average of students' understanding ability was in the high category and the students' mathematical reliability was in the high category too. Thus, the Edmodo video media for learning mathematics of functional derivatives meets the criteria, namely being valid, practical and effective in improving students' mathematical understanding and resilience.

The developed products can be used as supplemental material for learning in the classroom with their characteristics and benefits for students. This video-assisted media development only presents functional derivative material so that in the future, it can be developed for other materials that are suitable for the expected learning objectives.

REFERENCES

Aldoobie, N. (2015). ADDIE Model. *American International Journal of Contemporary Research*, *5*(6), 68–72.

Alqahtani, A. S. (2019). The Use of Edmodo: Its Impact on Learning and Students' Attitudes Toward It. *Journal of Information Technology Education: Research*, *18*, 319–330.

Anwar, Z., Kahar, M. S., Rawi, R. D. P., Nurjannah, N., Suaib, H., & Rosalina, F. (2020). Development of Interactive Video Based Powerpoint Media In Mathematics Learning. *Journal of Educational Science and Technology (EST)*, *6*(2), 167–177.

Arbain, A., & Farman, F. (2021). Pembelajaran Daring Masa Darurat Covid-19 Pada Mahasiswa Pendidikan Matematika. *HISTOGRAM: Jurnal Pendidikan Matematika*, *4*(2). https://doi.org/10.31100/histogram.v4i2.720.

Ariani, Y., Helsa, Y., Ahmad, S., & Prahmana, R. (2017). Edmodo social learning network for elementary school mathematics learning. *Journal of Physics: Conference Series*, *943*, 012056. https://doi.org/10.1088/1742-6596/943/1/012056

Azizah, N., Farida, & Sugiharta, I. (2018). Model Pembelajaran E-Learning Berbantuan Aplikasi Education Edmodo Dalam Meningkatkan Pemahaman Konsep Matematis. *Prosiding Seminar Nasional Matematika dan Pendidikan Matematika UIN Raden Intan Lampung*.

Balasubramanian, K., Jaykumar, V., & Fukey, L. N. (2014). A Study on "Student Preference towards the Use of Edmodo as a Learning Platform to Create Responsible Learning Environment". *Procedia - Social and Behavioral Sciences*, *144*, 416–422. https://doi.org/10.1016/j.sbspro.2014.07.311

Cahyani, E. P., Wulandari, W. D., Rohaeti, E. E., & Fitrianna, A. Y. (2018). Hubungan Antara Minat Belajar Dan Resiliensi Matematis Terhadap Kemampuan Pemahaman Matematis Siswa Kelas VIII SMP | Numeracy. *Jurnal Numeracy*, *5*(1), 49–56.

Eleanor, A., Uchenna, A., & Aruchi, N. (2019). Assessment Of Instructional Media Use In Enhancing Teaching And Learning Of Accounting By Business Education Students In The Niger Delta, Nigeria. *International Multidisciplinary Academic Research Journal*, *3*(1).

Farman, F., & Chairuddin, C. (2020). Pengembangan Media E-Learning Berbasis Edmodo Pada Materi Teorema Pythagoras. *AKSIOMA: Jurnal Program Studi Pendidikan Matematika*, *9*(4), 872–882. https://doi.org/10.24127/ajpm.v9i4.3114

Farman, F., Hali, F., & Rawal, M. (2021). Development of E-LKPD Using Live Worksheets for Online Mathematics Learning during Covid-19. *JME (Journal of Mathematics Education)*, *6*(1), 36–42. https://doi.org/10.31327/jme.v6i1.1626

Farman, F., & Yusryanto, Y. (2018). Pengembangan Desain Pembelajaran Berbasis Problem Posing Dalam Upaya Meningkatkan Kemampuan Penalaran Konsep Lingkaran Pada Siswa Smp Kelas VIII. *Jurnal Karya Pendidikan Matematika*, *5*(2), 20. https://doi.org/10.26714/jkpm.5.2.2018.20-27

Fatmanissa, N., Kusnandi, & Usdiyana, D. (2019). Student difficulties in word problems of derivatives: A multisemiotic perspective. *Journal of Physics: Conference Series*, *1157*, 032111. https://doi.org/10.1088/1742-6596/1157/3/032111

Hadi, F. R., & Rulviana, V. (2018). Analisis Proses Pembelajaran E-Learning Berbasis Edmodo pada Mata Kuliah Geometri. *Jurnal Bidang Pendidikan Dasar*, *2*(1), 63. https://doi.org/10.21067/jbpd.v2i1.2200

Hendriana, et al. (2017). *Hard skills dan Soft skills Matematika Siswa*. Refika Aditama.

Hopkins. (2012). *Instructional Design for E-learning: A Guide for The Global Learning Center.* Budapest: UNHCR GLC.

Korpela, H. K. (2015). Using Short Video Lectures to Enhance Mathematics Learning—Experiences on Differential and Integral Calculus Course for Engineering Students. *Informatics in Education*, *14*(1), 67–81. https://doi.org/10.15388/infedu.2015.05

Lalian, O. N. (2018). *The effects of using video media in mathematics learning on students' cognitive and affective aspects*. 030011. https://doi.org/10.1063/1.5061864

Mokhtar, A. (2018). Breaking Barriers Through Edmodo: A Qualitative Approach on the Perceptions of University of Malaya Undergraduates. *Online Learning Journal*, *22*, 362–382. https://doi.org/10.24059/olj.v22i1.1026

Muhammad, H. (2020). *Menyiapkan Pembelajaran di Masa Pandemi: Tantangan dan Peluang*. Kementerian Pendidikan dan Kebudayaan. (https://spab.kemdikbud.go.id/wp-content/uploads/2020/07/Menyiapkan-Pembelajaran-di-Masa-Pandemi-1.pdf)

Nurfaizah, Raharjo, S., & Saleh, H. (2021). Efektivitas Pembelajaran Matematika Berbasis Whatsapp Ditinjau dari Hasil Belajar Siswa (Masa Pandemi Covid 19). *ARITMATIKA: Jurnal Riset Pendidikan Matematika*, *2*(2), 100–115. https://doi.org/10.35719/aritmatika.v2i2.68

Tavukcu, T. (2018). The Impact of Edmodo Assisted Education on Project Evaluation Achievement Scores and Determination of Opinions for use in Education. *TEM Journal*, *7*(3), 651–657.

Trisniawati, T., Muanifah, M., Widodo, S., & Ardiyaningrum, M. (2019). Effect of Edmodo towards interests in mathematics learning. *Journal of Physics: Conference Series*, *1188*, 012103. https://doi.org/10.1088/1742-6596/1188/1/012103

Ulfah, S., & Muntazhimah, M. (2020). Mathematics Resilience Of Pre-Service Mathematics Teacher. *International Journal of Scientific & Technology Research*, *9*, 1442–1445.

Wardono, Waluya, S. B., Mariani, S., & Candra D, S. (02016). Mathematics Literacy on Problem Based Learning with Indonesian Realistic Mathematics Education Approach Assisted E-Learning Edmodo. *Journal of Physics: Conference Series*, *693*, 012014. https://doi.org/10.1088/1742-6596/693/1/012014