

E-Module of Cube and Cuboid Based On Ethnomathematics for Five-Grade Elementary School Students

Dyah Triwahyuningtyas¹, Novia Eka Mahmuda², Ardila³

^{1,2,3}Elementary School Teacher Education, Universitas PGRI Kanjuruhan Malang, Indonesia

dyahtrihayu@unikama.ac.id¹

ABSTRACT

Article History:

Received : 17-04-2022

Revised : 22-06-2022

Accepted: 24-06-2022

Online : 16-07-2022

Keywords:

E-Module;

Cube and Cuboid;

Ethnomathematics.



The background of this research is to produce and develop cube and cuboid material e-module products centred on regional culture. The teaching materials are still printed books containing material and questions without any complex mathematical concepts, so there is a lack of linking regional culture with mathematics. That affects the lack of understanding of students' ethnomathematics during the geometry material pandemic. This study aims to develop an e-module cube and cuboid based on ethnomathematics for fifth-grade elementary school students. Research development methods with 4D include definition, design, development and deployment. The data was analyzed using quantitative and qualitative data analysis techniques through media and material expert validators and teacher and student response questionnaires. The results showed that the e-module cube and cuboid based on ethnomathematics were declared feasible or valid with an average score of 82.5%. They used e-modules through teacher and student response questionnaires and obtained an average score of 85%, which was stated to be very practical. Therefore, it affects students' cognitive understanding of cube and cuboid material with an average value of 84.1. The ethnomathematics-based e-module cube and cuboid can help students improve their contextual abilities..



<https://doi.org/10.31764/jtam.v6i3.8434>



This is an open access article under the [CC-BY-SA](https://creativecommons.org/licenses/by-sa/4.0/) license

A. INTRODUCTION

Indonesia is experiencing significant challenges facing the industrial revolution 4.0 and COVID 19 in every field. The impact felt from these problems is not only felt by the health sector, but almost all sectors are affected, one of which is the education sector (Pragholapati, 2020). Technology can distribute information so that all students respond in the learning process (even einum). In the 4.0 industrial revolution and the digitalization of learning activities during the pandemic, the online system is accessed wherever the location is occupied by students (Lestari, 2020). Strategies to improve online learning are interactions between students online, creating conducive learning conditions, involving supportive learning tools, providing feedback, and creating learning content (Yulia, 2020). Using technology, students can produce sketches to solve problems related to experience (Hoyles, 2018). So that teaching materials such as texts, reference books, journals, dictionaries, encyclopedias, magazines, and more can be accessed via mobile phones or computers online (Kufi et al., 2020).

The technology module is a modern educational medium and helps to learn activities during the pandemic. Creating modern media, commonly known as electronic modules, requires knowledge of the correct installation program and system (Atiwitayaporn & Vehachart, 2012). The definition of an e-module is in four parts: the absence of loss of books, content, devices used to create reader content and distribution of readers that anyone can access (Letchumanan & Ahmad, 2010). So that the use of this e-module can help achieve learning goals that can be accessed by students and cannot be lost even though time has passed. That is advantageous during a pandemic that can be travelled long distances and accessed anywhere (Syah, 2020). The use of e-modules in learning mathematics has failed due to students' difficulty in reasoning mathematically in elementary school so that the real things are needed according to examples of experience and phenomena in each student (Boero et al., 2018).

Based on the research results in the field, the teaching materials used by fifth-grade elementary school teachers, especially mathematics learning with geometry material, still use printed books or student handbooks containing material and questions. There are several drawbacks to using printed, or student handbooks in learning, namely, the material presented is less contextual. When conducting research, it was found that students still did not understand the concept. However, there were still students who memorized the formula without understanding the concept in its application in everyday life. Thus, students have not been trained to relate the material to everyday life or the environment around students in finding concepts. It impacts the learning process where we are currently experiencing a pandemic period so that the face-to-face process is limited and carried out online by accessing technology so that learning is conducive so that it can be carried out between teachers and students delivering material. We need a place to facilitate the learning process by using e-modules that are packaged excitingly. They are not bored when studying at home, forming independent students without involving parents in their use related to the contextual cube and cuboid material, one of the math materials.

This has been carried out by research by Bai et al., (2015) suggesting that children who are taught mathematical concepts by not relating them in their daily lives will make children forget quickly and even cannot apply mathematics to cube and block material or called geometry. mathematics, namely problem solving, reasoning and proof, communicating, connection and representation (Cook & Borkovitz, 2017). Suryawati et al., (2010) mathematics is not a science for memorizing formulas in order to calculate and find the final result, but mathematics is understanding and inculcating mathematical concepts by linking the lives around students so that it will have an impact on the process of applying mathematics in student activities. Mathematics is a science that deals with the concepts of everyday life, especially three-dimensional building materials (geometry) (Yuniasih, Nury; Wahyuningtyas, 2019). In accordance with the opinion of the application of various mathematical concepts, one of them is building material (cubes and cuboid) or what is commonly called geometry learning.

Van Hiele believes that in geometry in elementary school, students will learn the material of flat shapes, building spaces where flat shapes are for grade 3 and building spaces for grade five in their application. Technology-based geometry is easily constructed (constructed), manipulated, measured, searched and verified (Chan & Leung, 2014). That relates to the

teaching and learning process, especially to teachers who must be responsible for teaching geometry to children by providing direct experience (Bayrak et al., 2014). In addition, topographical assignments can increase students' abilities and skills in determining the area of the gazebo, garden, guardrail, and house volume (Vidermanova & Vallo, 2015). The geometry of the part of the concept information creates an opportunity to generate an attractive and pleasant positive attitude (Bayrak et al., 2014). Geometry is related to everyday life, for example, observing geometric shapes, reasoning geometric concepts, recognizing their properties, ordering the nature of concepts, reasoning and organizing evidence logically, and comparing geometry without being shown a concrete object (Bulut & Bulut, 2012). Geometry material is contained in teaching materials in the form of electronic teaching materials.

Teaching materials that can be used to support online learning during the COVID-19 pandemic are using electronic modules (e-modules). According to Syukra (2019), an e-module is a set of independent teaching materials arranged in detail and presented in electronic form in animation, audio and navigation to achieve learning objectives. Independent teaching materials prepared to support the teaching and learning process are e-modules. An electronic module is a book format presented in electronic form, so a computer or electronic book reader is required to read it. E-modules can attract students' interest in learning geometry because, in the e-modules, there are animated images, learning videos, and quizzes that can be done directly by students. One of the software used in making this e-module is a Sigil. Sigil is an application for making digital books in an ePUB format that can be stored on a flash drive. Word files that have been converted to ePub can be read through the ePub Ebook Reader application (Liana et al., 2019). The sigil application is an application that can be used to develop digital learning modules (Ramadhani & Fitri, 2020). The application of e-modules by applying ethnomathematics when learning takes place.

Ethnomathematics is mathematics influenced by specific cultural elements, so ethnomathematics is defined as the cultural anthropology of mathematics and mathematics education. Ethnomathematics is an approach that can be used to explain the reality of the relationship between environmental cultures and mathematics where students use mathematical experiences from their own culture or other cultures (Hardiarti, 2017; Pebriana, 2017; Verner et al., 2019). The advantage of this rich cultural experience is that students must be exposed to various cultural experiences and resources. Linking them with learning cultures will be more meaningful and able to develop their own cognitive, social and emotional attitudes (d'Entremont, 2015; Suharta et al., 2017; Verner et al., 2019).

Several previous researchers have developed ethnomathematical-based mathematics teaching materials in the form of e-modules and Student Activity Sheets that are associated with the culture of the Yogyakarta palace (Ayuningtyas & Setiana, 2019). Furthermore, the teaching materials developed by (Aini & Masykur, 2018) are in the form of math handouts that are linked to local culture. Ethnomathematics is one of the ideas to facilitate learning mathematics with culture and teachers to more easily instil cultural values so that meaningful learning will be created (Andriyani & Kuntarto, 2017; Masamah, 2018). Previous research has linked Balinese traditional house culture with cylinder volume learning and can improve student achievement (Suharta et al., 2017). Mathematics is inseparable from culture; ethnomathematics is essential in motivating students (Abi, 2017; Zaenuri & Dwidayati, 2018).

Based on this research, the importance of conducting sustainability research in developing e-module cubes and cuboids is based on cultural ethnomathematics in Indonesia. The study aimed to determine the feasibility, practicality and effectiveness of developing ethnomathematical-based e-modules for building cubes and cuboids for fifth-grade elementary school students.

B. METHODS

This type of research is development research. This research is development research using a development model. Researchers use the type of 4D model development, which includes: Define, Design, Develop and Disseminate. The researchers chose the 4D model because the developed e-modules can be arranged in a complex and systematic way, making it easier for researchers to develop products. Defining activities are determining the conditions that must be met and finding materials and online media needed in learning activities. Planning is done by designing and compiling materials according to an ethnomathematical approach, including format selection, media selection and initial design. The development stage tests two validators: media experts and materials experts who assess product validity. According to Sugiyono (2016), e-modules are said to be valid if the modules developed are based on e-module development procedures and have been validated by experts. After that, the development activities go through the validity/feasibility test, e-module products that have been designed and made are given to experts to be given an assessment of suggestions or criticisms that are useful for improving e-modules so that they can be distributed to students, product improvement and the trial phase. Furthermore, dissemination or distribution activities are carried out by distributing products with a broader reach, such as in other classes or academic units.

The research uses quantitative and qualitative data analysis techniques. Quantitative analysis is in the form of validators and respondents filling out questionnaires related to e-module cube and cuboid based on fifth-grade elementary school ethnomathematics. The validator's results are evidence to test the feasibility or validity of the ethnomathematics-based e-module cube and cuboid. The qualitative analysis comes from media and material experts' suggestions and criticisms. Furthermore, the response of teachers and students to fill in the criteria as a reference for the primary material for revision of the ethnomathematics-based e-module cube and cuboid developed by the researcher. Furthermore, the practicality test through e-module products is given to teachers and students in order to get a response to fill in the criteria as a reference for basic revision materials, besides that it is also effective through a posttest exam given to students to be given questions and done by students to find out the student scores that have been done. The score criteria were taken from the results of the teacher and student responses as well as the posttest scores for the ethnomathematics-based e-module of cubes and blocks developed by the researcher.

C. RESULT AND DISCUSSION

They are developing ethnomathematics-based e-module cube and cuboid for fifth-grade elementary school students using the 4D method through the four stages of Thiagarajan, as shown in Figure 1.

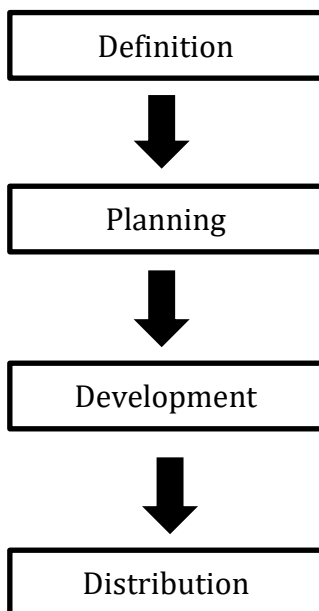


Figure 1. 4D model

The stages are (1) Definition, researchers determine material limits and determine online teaching materials used during the pandemic, (2) Planning, researchers make designs such as format selection, media and initial design, (3) development, researchers carry out validation or feasibility tests to material experts and media based on module procedures (Faroh et al., 2018), (4) distribution, researchers distribute e-module products with a wide range, either distributed in class or other educational units and fill out teacher and student response questionnaires and carry out learning outcomes students in the use of the inquiry ethnomathematics e-module for fifth-grade elementary school students.



The design of e-modules is arranged systematically with attractive presentations in terms of material and statements related to students' daily lives or the environment around students. Each picture has an explanatory sentence or topic according to the material and ethnomathematical steps to measure cognition related to culture or understanding of the material contained in the e-module.

1. Ethnomathematical Stage Observing Problems

The results of the e-module development can be seen from stage 1 of ethnomathematics as shown in Figure 2.


Ayo Mengamati!

- Coba amatilah candi yang dikunjungi Edo!
- Edo melihat banyak benda-benda yang menyerupai bentuk bangun ruang balok.

Sambar di samping menyerupai bangun ruang apa?

Jawab: _____




BANGUN RUANG BERBASIS ETNOMATEMATIKA

A. Bangun Ruang Berbasis Etnomatematika

Ayo Membaca!

Liburan Edo

Liburan semester satu telah tiba. Edo bersama keluarga berlibur ke Jogja dan ada beberapa destinasi yang akan dikunjungi yaitu candi prambanan, candi borobudur, malibora dan parangtritis. Sesampai dijogja Edo bersama keluarga beristirahat sejenak dan melanjutkan perjalanan ke candi prambanan. Disini Edo mendapatkan berbagai pengalaman salah satunya tentang sejarah berdirinya candi prambanan.



<http://gabana.merit.fanpage.com/212716-foto-memori-tembang-candi-prambanan>

Candi Prambanan adalah candi Hindu terbesar di Indonesia yang dibangun pada abad ke-9 masehi. Menurut prasasti Siwagrha, candi ini dibangun pada abad ke 850 masehi oleh Rakai Pikatan dan terus dikembangkan dan diperluas oleh Balitung Maha Sumbu pada masa kerajaan Medang Mataram. Setelah mengunjungi candi prambanan Edo dan keluarga menuju ke destinasi selanjutnya ke candi Borobudur. Disini Edo juga mengetahui sejarah berdirinya candi borobudur.

BANGUN RUANG BERBASIS ETNOMATEMATIKA

Figure 2. Ethnomathematics Stage Observing problems through reading

They are based on Figure 2, observing the problem by presenting questions related to the shape of a cube where the shape of the space is presented with a candle image complete with reading text. Students will observe the image of the temple then the image of the temple is broken into one by one parts into a flat square shape. So students will learn the concept that the shape of a cube is a combination of a flat square shape so that students will find the surface area of the cube and easily understand the volume. After observing, students will try to express opinions by making hypotheses or conjectures. In contrast, students will try to answer questions according to the questions that have been presented. Those are from story questions to find the area of a square and the form of images of nets and building a cube-shaped space. That is to determine the surface area of the cube and how the work is carried out in stages. More importantly, there is a check of answers. After students work, students can immediately check the answers that have been answered. That is following (Villardón-gallego, 2016), which states that the inquiry step is related to observing the problem with the experience they have and making temporary guesses between the events in the e-module and the students' individual experiences.

2. Ethnomathematical Stage Designing and Conducting Experiments

The e-module development results in terms of the ethnomathematical stage of stage 2 are presented as shown in Figure 3.

Proses pembangunan candi Borobudur diperkirakan menghabiskan waktu 75 sampai 100 tahun lebih. Candi Borobudur baru benar-benar selesai 100% pada masa pemerintahan raja Samaratungga pada tahun 825 Masehi.

Ayo Mencoba!

Sebelumnya kalian sudah belajar menentukan volume kubus dengan menggunakan kubus satuan. Nah, sekarang bagaimana cara menentukan volume balok dengan menggunakan kubus satuan? Apakah sama dengan cara menentukan volume kubus?

Alas balok terdiri atas 5 × 4 kubus satuan = kubus satuan, sedangkan tinggi balok = kubus satuan. Jumlah seluruh kubus satuan = kubus satuan = kubus satuan. Jadi, volume balok tersebut adalah kubus satuan.

Perhatikan kembali gambar balok disamping. Misalnya, panjang rusuk kubus satuan = 1 cm, maka:
 Luas alas balok = cm × cm = cm²
 Tinggi balok = cm
 Volume balok = luas alas × tinggi = cm × cm = cm³


Dengan demikian, volume balok adalah:

$V_{\text{balok}} = \dots \times \dots \times \dots$



C. Menentukan Volume Balok Dengan Kubus Satuan

Setelah belajar menentukan volume kubus menggunakan kubus satuan. Sekarang kita akan belajar cara menentukan volume balok dengan kubus satuan. Bagaimana caranya? Apa sama dengan cara menentukan volume pada kubus?

Ayo Mencoba!



Halaman ini menyajikan foto 2D dan 3D dari Borobudur!

Apakah ingatkah kamu dengan candi borobudur? Dari bangunan candi borobudur ini banyak yang menyerupai bangun ruang. Bangun ruang apa yang menyerupai gambar diatas?

Jawab: _____

Figure 3. Ethnomathematics Stage Observation and experimenting

In Figure 3, students will be invited to the stage of designing an experiment; after the experiment stage. the student will find a cube that is presented in the form of a temple that has different sizes with the image of the cube presented in a square in it and students determine the volume. It is from the temple picture, and students immediately check the answer. After that, students will be invited to conduct experiments to obtain information. Students are trying to find a picture of a cube, calculating the volume of a cube through a unit cube by looking for length, width and height. Students are invited to understand the concept one by one to determine the concept of the volume of a cube. Designing and conducting these experiments can be related to understanding cause and effect, relationships and forces, and designing and collecting concrete evidence that is culturally motivated by each individual's ideas, following the reality that students themselves experience about geometry (Thuneberg et al., 2018).

3. Ethnomathematical Stage of Analysis and Conclusion


The e-module development results in the Ethnomathematics stage 3 are presented as shown in Figure 4.

Soal Evaluasi

Jawablah pertanyaan berikut dengan memberi tanda silang (x) pada jawaban yang benar!


1. Perhatikan gambar candi di samping! Gambar berlingkar merah menyerupai bangun ruang...

a. Kubus
b. Balok
c. Segitiga
d. Tabung



2. Volume balok disamping adalah ...

a. 4 kubus satuan
b. 3 kubus satuan
c. 6 kubus satuan
d. 8 kubus satuan



3. Rumus Volume dari bangun ruang balok adalah ...


a. $V = \text{Panjang} \times \text{lebar} \times \text{tinggi}$
b. $V = \text{sisik} \times \text{sisik} \times \text{sisik}$
c. $V = 6 (p \times l)$
d. $V = 2 (p \times l)$

4. Sebuah balok memiliki panjang 28 cm, lebar 14 cm, dan tingginya 12 cm. Volume balok tersebut adalah ... cm³

a. 4.700
b. 4.702
c. 4.704
d. 4.706

Ayo Berlatih!

Setelah kalian mengetahui cara menghitung volume balok dengan kubus satuan, selanjutnya coba kerjakan soal-soal dibawah ini untuk meningkatkan kemampuan kalian!



1. Makam Sultan Hasanudin terletak di Kabupaten Somba Opu, Gowa Sulawesi Selatan. Makam Sultan Hasanudin sendiri berbentuk lingkar dengan das kaya nisan di bagian atas makam. Pada makam Sultan Hasanudin terdapat tulisan yang bertuliskan antara lain tahun kelahiran serta tanggal wafat Hasanudin yakni 12 Juni 1670. Coba temukan dan tunjukkan dari makam Sultan Hasanudin yang berbentuk menyerupai balok!

Jawab:

Figure 4. Ethnomathematics Stage Analysis and conclusion

Figure 4 shows students collecting information through video by observing the video from beginning to end and then collecting detailed information. After that, students will analyze the information that has been collected related to videos and animated images in the form of temples, and students can immediately check the answers. In the last stage, students conclude by observing pictures of cube-shaped shapes along with cube nets so that they can answer the questions that have been provided, starting from the names of the shapes, edges, sides and others, and students can immediately check the answers. Students' efforts in developing their ideas must draw a conclusion based on objective evidence with a conceptual review that can be accounted for both from concepts based on student experience or literature (Voet & Wever, 2016).

The design of the cube and cuboid space building module, which contains material for the volume of cubes and blocks, observes pictures of Prambanan temples and Borobudur temples. Determines images that resemble cubes and blocks and contains practice questions that relate to culture in Indonesia (Candi Badhut, Jago Temple, Watu Gilang, Kelurak Inscription, tomb of Sultan Hasanudin, Gamelan). This cube and cuboid building module relates to a culture commonly called ethnomathematics. Mathematics needs to provide content to bridge between mathematics in the everyday world based on culture (Wulantina & Maskar, 2019). Researchers conducted a feasibility test and practicality test and tested the effectiveness of the inquiry-based cuboid e-module. Based on the feasibility assessment carried out by media expert validators and teaching materials, they are presented as shown in Table 1.

Table 1. The media and material expert validation of questionnaire assessment results

Validator	Value obtained
Media expert	77,5%
Material expert	87,5%
Average	82,5%

Based on Table 1, the assessment results from material and teaching materials experts are known that the module gets 82.5%. The developed module is feasible but with revisions according to the input from the validator of teaching materials and materials experts. In line with the research (Disnawati & Nahak, 2019), Student Worksheets based on the Ethnomathematics of Eastern Weaving are valid for the learning process.

After that, deploy the e-module that has been developed and finish passing the expert validation stage and development trial. E-module cube and cuboid based on ethnomathematics for fifth-grade elementary school students are ready to be distributed in the form of soft files and the addition of applications easily on each student's android. After conducting field trials by researchers in product testing, the assessment results of student and teacher responses as shown in Table 2.

Table 2. Results of Teacher and Student Responses

Respondent	Value obtained
Teachers	93%
Students	90%
Average	91,5%

The average of all teacher and student assessments showed that the inquiry-based e-module cube and cuboid got an average score of 85.0% using the "practical" category. That follows research by Buchori & Rahmawati (2017) with eligible criteria of 85.2% through student responses using the module. Thus, the e-module cube and cuboid based on ethnomathematics for fifth-grade elementary school students are deemed suitable for mathematics learning activities. It has been developed through analysis of student learning outcomes tests to determine the effectiveness of the e-module cube and cuboid based on ethnomathematics. The average test score is 84.1 in using ethnomathematics-based e-modules and cuboids in fifth-grade learning activities in elementary schools. The post-test exam was carried out by 20 students with five questions provided with types of questions related to culture, one of which was in the form of a temple associated with calculating the volume of a space. The research of Kumnuansin & Khlaisang (2015) states that there was a difference with a significant level between the pre-test and post-test values of 0.05. Innovative learning methods related to culture with electronic media in the form of e-modules to create motivational learning so that learning is student-centred. Improving literacy and the bias associated with the culture around students in the use of e-modules will make students interested in the learning process (Korat & Shamir, 2008).

Research findings from Roskos et al. (2017) stated that the content of e-modules in the learning process is more effective in curriculum management so that the curriculum develops and collaborates more rapidly. E-module is proven that the media used in distance learning is that everyone has the freedom to reach information in solving problems (Gorghiu et al., 2011). Using ethnomathematics will increase the love of culture around students, which positively impacts society in terms of education and culture (Abdullah, 2017). Learning accessed in geometry electronics will provide feedback, generate and develop examples and literacy resources related to geometry. Ethnomathematical learning provides learning opportunities and strengthens cultural connections in mathematics learning abilities (Prieto et al., 2015). In

addition, it acts as student evidence in preserving the culture around students so that students can develop abilities in the development of mathematics learning (Supiyati et al., 2019).

Based on the results of the analysis of the criteria for the e-module, the cube and cuboid material based on ethnomathematics for fifth-grade elementary school students has met three criteria, namely the feasibility test, practicality test and effectiveness test. Thus, cube-based and cuboid-based e-modules for fifth-grade elementary school students can improve the ability to connect cultural fields with mathematics.

D. CONCLUSION AND SUGGESTIONS

Based on the results of the initial product design from the discussion, it was concluded that the ethnomathematics-based e-module cube and cuboid were declared valid or feasible to obtain from an average value of 82.05%. Meanwhile, the practicality of the e-module through teacher and student response questionnaires was stated to be very practical, with an average score of 85.%. In addition, the product's effectiveness using the e-module learning outcomes test obtained an average score of 84.1 with an effective category because the value is above the KKM score of more than 70. The results of these acquisitions indicate the completeness of learning outcomes related to contextual students.

This research is expected to develop teaching materials in the form of e-modules, cubes and ethnomathematics-based cuboids that can be used during a pandemic. So, the students will develop a passion for learning and be able to provide innovations with a broader thought that mathematics can be linked to culture.

To create a mindset that mathematics can be used as a reference that mathematics is a concept that cannot be separated from the culture in the student environment. Further research can continue by displaying e-modules with more exciting materials and creating a critical mindset in linking more diverse cultural conditions, planting more detailed concepts to produce innovations in developing teaching materials as sustainable research.

REFERENCES

- Abdullah, A. S. (2017). Ethnomathematics in perspective of sundanese culture. *Journal on Mathematics Education*, 8(1), 1–16. <https://doi.org/10.22342/jme.8.1.3877.1-15>
- Abi, A. M. (2017). Integrasi Etnomatematika Dalam Kurikulum Matematika Sekolah. *JPMI (Jurnal Pendidikan Matematika Indonesia)*, 1(1), 1. <https://doi.org/10.26737/jpmi.v1i1.75>
- Aini, E. P., & Masykur, R. (2018). Handout Matematika berbantuan Etnomatematika Berbasis Budaya Lokal PENDAHULUAN Pada era kemajuan ilmu pengetahuan teknologi , tentunya pendidikan harus mengikuti perkembangan zaman yang ada , karena pendidikan merupakan sarana untuk menuju kepada pertumbu. *Desimal: Jurnal Matematika*, 1(1), 73–79.
- Andriyani, & Kuntarto. (2017). Etnomatematika : Model Baru. *Jurnal Gantang*, II(2), 133–144. <http://ojs.umrah.ac.id/index.php/gantang/index>
- Atiwitayaporn, C., & Vehachart, R. (2012). Operation in Educational Administration Development of Values about the Sufficiency Project Presented by E-Book. *Procedia - Social and Behavioral Sciences*, 46, 363–366. <https://doi.org/10.1016/j.sbspro.2012.05.123>
- Ayuningtyas, A. D., & Setiana, D. S. (2019). Pengembangan Bahan Ajar Matematika Berbasis Etnomatematika Kraton Yogyakarta. *AKSIOMA: Jurnal Program Studi Pendidikan Matematika*, 8(1), 11–19. <https://doi.org/10.24127/ajpm.v8i1.1630>
- Bai, Z., Hunziker, M., Dolev, S., Even, R., Hadar, L. L., Kuz'ina, G. V., Lockwood, E., Reed, Z., Caughman, J. S., Schaumann, G., Son, J. W., Kim, O. K., Wijaya, A., van den Heuvel-Panhuizen, M., & Doorman, M. (2015). Teachers' selection and enactment of mathematical problems from textbooks.

- International Journal of Research in Undergraduate Mathematics Education*, 3(3), 309–327. <https://doi.org/10.1007/s40753-016-0045-y>
- Bayrak, N., Yüce, S., & Kaan, M. (2014). The Investigation of the Viewpoint of Academic Staff and Graduate Students in Teaching Geometry in Elementary School. *Procedia - Social and Behavioral Sciences*, 116, 2115–2119. <https://doi.org/10.1016/j.sbspro.2014.01.529>
- Boero, P., Fenaroli, G., & Guala, E. (2018). Mathematical Argumentation in Elementary Teacher Education: The Key Role of the Cultural Analysis of the Content. In *Advances in Mathematics Education Research on Proof and Proving* (pp. 49–67). Springer International Publishing. https://doi.org/10.1007/978-3-319-70996-3_4
- Buchori, A., & Rahmawati, N. D. (2017). Pengembangan E-Modul Geometri Dengan Pendekatan Matematika Realistik Di Sekolah Dasar. *Sekolah Dasar: Kajian Teori Dan Praktik Pendidikan*, 26(1), 23–29. <https://doi.org/10.17977/um009v26i12017p023>
- Bulut, N., & Bulut, M. (2012). Development of Pre-Service Elementary Mathematics Teachers' Geometric Thinking Levels Through an Undergraduate Geometry Course. *Procedia - Social and Behavioral Sciences*, 46(1986), 760–763. <https://doi.org/10.1016/j.sbspro.2012.05.194>
- Chan, K. K., & Leung, S. W. (2014). Dynamic geometry software improves mathematical achievement: Systematic review and meta-analysis. *Journal of Educational Computing Research*, 51(3), 311–325. <https://doi.org/10.2190/EC.51.3.c>
- Cook, S. A., & Borkovitz, D. K. (2017). Student Perceptions of a Mathematics Major for Prospective Elementary Teachers with an Inquiry-Based Philosophy. *Primus*, 27(1), 125–147. <https://doi.org/10.1080/10511970.2016.1194341>
- d'Entremont, Y. (2015). Linking Mathematics, Culture and Community. *Procedia - Social and Behavioral Sciences*, 174(1999), 2818–2824. <https://doi.org/10.1016/j.sbspro.2015.01.973>
- Disnawati, H., & Nahak, S. (2019). Pengembangan Lembar Kerja Siswa Berbasis Etnomatematika Tenun Timor pada Materi Pola Bilangan. *Jurnal Elemen*, 5(1), 64. <https://doi.org/10.29408/jel.v5i1.1022>
- Faroh, N., Nalurita, I. V., & Wildani, J. (2018). Pengembangan Modul Konstruktivisme Pada Mata Kuliah Matematika Dasar Untuk Meningkatkan Kompetensi Mahasiswa. *APOTEMA: Jurnal Program Studi Pendidikan Matematika*, 4(2), 33–39.
- Gorghiu, L. M., Gorghiu, G., Bizoi, M., & Suduc, A. M. (2011). The electronic book - A modern instrument used in teachers' training process. *Procedia Computer Science*, 3, 563–567. <https://doi.org/10.1016/j.procs.2010.12.093>
- Hardiarti, S. (2017). Etnomatematika: Aplikasi Bangun Datar Segiempat Pada Candi Muaro Jambi. *Aksioma*, 8(2), 99. <https://doi.org/10.26877/aks.v8i2.1707>
- Hoyles, C. (2018). Transforming the mathematical practices of learners and teachers through digital technology*. *Research in Mathematics Education*, 20(3), 209–228. <https://doi.org/10.1080/14794802.2018.1484799>
- Korat, O., & Shamir, A. (2008). The educational electronic book as a tool for supporting children's emergent literacy in low versus middle SES groups. *Computers and Education*, 50(1), 110–124. <https://doi.org/10.1016/j.compedu.2006.04.002>
- Kufi, E. F., Negassa, T., Melaku, R., & Mergo, R. (2020). Impact of corona pandemic on educational undertakings and possible breakthrough mechanisms. *BizEcons Quarterly*, 11(June), 3–14. <https://ideas.repec.org/a/ris/buecqu/0022.html>
- Kumnuansin, J., & Khlaisang, J. (2015). Development of a Model of Thai Literature Hypermedia Electronic Books with Social Media Based on the Reader-response Theory to Enhance Reading Comprehension of Elementary School Students. *Procedia - Social and Behavioral Sciences*, 174, 1700–1706. <https://doi.org/10.1016/j.sbspro.2015.01.824>
- Lestari, P. A. S. G. (2020). The Impact of Covid-19 Pandemic on Learning Implementation of Primary and Secondary School Levels. *Indonesian Journal of Elementary and Childhood Education*, 1(2), 58–63.
- Letchumanan, M., & Ahmad, R. (2010). Utilization of e-book among University Mathematics Students. *Procedia - Social and Behavioral Sciences*, 8(5), 580–587. <https://doi.org/10.1016/j.sbspro.2010.12.080>
- Liana, Y. R., Ellianawati, & Hardyanto, W. (2019). Pengembangan E-Modul Interaktif Berbasis Android

- Menggunakan Sigil Software pada Materi Listrik Dinamis. *Seminar Nasional Pascasarjana Universitas Negeri Semarang*, 926–932.
- Masamah, U. (2018). BERBASIS BUDAYA LOKAL KUDUS Ulfa Masamah Abstrak Kemampuan matematika siswa dalam menyelesaikan soal penalaran dan pemecahan masalah siswa masih rendah (hasil studi TIMMS dan PISA , 2012). Hal ini disebabkan karena pembelajaran yang berlangsung kurang m. *Jurnal Pendidikan Matematika*, 2(1), 126–154.
- Pebriana, P. H. (2017). Analisis Penggunaan Gadget terhadap Kemampuan Interaksi Sosial pada Anak Usia Dini. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini*, 1(1), 1. <https://doi.org/10.31004/obsesi.v1i1.26>
- Pragholapati, A. (2020). *New Normal "Indonesia" After Covid-19 Pandemic*. 2019, 1–6. <https://doi.org/10.31234/osf.io/7snqb>
- Prieto, L., Claeys, L., & González, E. L. (2015). Transnational Alliances: La Clase Mágica—Nepohualtzitzin Ethnomathematics Club. *Journal of Latinos and Education*, 14(2), 125–134. <https://doi.org/10.1080/15348431.2015.1011470>
- Ramadhani, R., & Fitri, Y. (2020). Pengembangan E-Modul Matematika Berbasis Model Flipped-Blended Learning. *Genta Mulia*, 11(2), 150–163.
- Roskos, K., Brueck, J., & Lenhart, L. (2017). An analysis of e-book learning platforms: Affordances, architecture, functionality and analytics. *International Journal of Child-Computer Interaction*, 12, 37–45. <https://doi.org/10.1016/j.ijcci.2017.01.003>
- Sugiyono. (2016). *Metode Penelitian Kualitatif, Kuantitatif, dan R&D*. Bandung: Alfabeta.
- Suharta, I. G. P., Sudiarta, I. G. P., & Astawa, I. W. P. (2017). Ethnomathematics of Balinese Traditional Houses. *International Research Journal of Engineering, IT & Scientific Research*, 3(4), 42. <https://doi.org/10.21744/irjeis.v3i4.501>
- Supiyati, S., Hanum, F., & Jailani. (2019). Ethnomathematics in sasaknese architecture. *Journal on Mathematics Education*, 10(1), 47–57. <https://doi.org/10.22342/jme.10.1.5383.47-58>
- Suryawati, E., Osman, K., & Meerah, T. S. M. (2010). The effectiveness of RANGKA contextual teaching and learning on student's problem solving skills and scientific attitude. *Procedia - Social and Behavioral Sciences*, 9, 1717–1721. <https://doi.org/10.1016/j.sbspro.2010.12.389>
- Syah, R. H. (2020). Dampak Covid-19 pada Pendidikan di Indonesia: Sekolah, Keterampilan, dan Proses Pembelajaran. *SALAM: Jurnal Sosial Dan Budaya Syar-I*, 7(5). <https://doi.org/10.15408/sjsbs.v7i5.15314>
- Syukra, H. A. (2019). Pengembangan E-Modul Laju Reaksi Berbasis Inkuiri Terbimbing Terintegrasi Virtual Laboratory Untuk SMA/ MA. *Journal of Multidisciplinary Research and Development*, 1(4), 877–886. <https://doi.org/10.24036/ekj.v1.i1.a8>
- Thuneberg, H. M., Salmi, H. S., & Bogner, F. X. (2018). How creativity, autonomy and visual reasoning contribute to cognitive learning in a STEAM hands-on inquiry-based math module. *Thinking Skills and Creativity*, 29(April), 153–160. <https://doi.org/10.1016/j.tsc.2018.07.003>
- Verner, I., Massarwe, K., & Bshouty, D. (2019). Development of competencies for teaching geometry through an ethnomathematical approach. *Journal of Mathematical Behavior*, 56(May 2017), 100708. <https://doi.org/10.1016/j.jmathb.2019.05.002>
- Vidermanova, K., & Vallo, D. (2015). Practical Geometry Tasks as a Method for Teaching Active Learning in Geometry. *Procedia - Social and Behavioral Sciences*, 191, 1796–1800. <https://doi.org/10.1016/j.sbspro.2015.04.421>
- Villardón-gallego, L. (2016). Inquiry-based learning in pre-service training for secondary education counselors. *Procedia - Social and Behavioral Sciences*, 217, 65–73. <https://doi.org/10.1016/j.sbspro.2016.02.028>
- Voet, M., & Wever, B. De. (2016). History teachers ' conceptions of inquiry-based learning , beliefs about the nature of history , and their relation to the classroom context. *Teaching and Teacher Education*, 55, 57–67. <https://doi.org/10.1016/j.tate.2015.12.008>
- Wulantina, E., & Maskar, S. (2019). Pengembangan Bahan Ajar Matematika Berbasis Lampungnese Etnomatematics. *Edumatica: Jurnal Pendidikan Matematika*, 09(02).
- Yulia, H. (2020). Online Learning to Prevent the Spread of Pandemic Corona Virus in Indonesia. *ETERNAL (English Teaching Journal)*, 11(1), 48–56. <https://doi.org/10.26877/eternal.v11i1.6068>
- Yuniasih, Nury; Wahyuningtyas, D. T. (2019). Geometry Module with CTL Approach for Elementary School Learning. *Advances in Social Science, Education and Humanities Research, Volume 287, 1st*

International Conference on Education and Social Science, 287(Icesre 2018), 241–243.
<https://doi.org/10.2991/icesre-18.2019.52>

Zaenuri, & Dwidayati, N. (2018). Exploring ethnomathematics: mathematics as a cultural product. Prisma, proceedings of the national mathematics seminar., *PRISMA, Prosiding Seminar Nasional Matematika*, 1(1), 471–476.
<https://journal.unnes.ac.id/sju/index.php/prisma/%0Ahttps://jurnalmahasiswa.unesa.ac.id/index.php/mathedunesa/article/view/249%0Ahttps://sinta.ristekbrin.go.id/journals/detail?id=146>