



Development of Entrepreneurship-Based Mathematical E-Module and Its' Learning with PBL to Improve Students' Mathematical Problem Solving Ability

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ARTICLE INFO

Article history:

Received 6 December 2022
Received in revised form 26 February 2023
Accepted 28 March 2023

Keywords:

Math E-Module;
entrepreneurship;
mathematical problem
solving ability;
PBL

Abstract

The purpose of this study was to determine the validity of the entrepreneurship-based mathematics E-Module, the practicality and effectiveness of learning mathematics with the PBL model assisted by the entrepreneurship-based mathematics E-Module to improve students' mathematical problem solving abilities. This research was a development research with the ADDIE model which is applied to class XI of SMK Negeri 1 Lemahabang, Cirebon Regency. The results showed that the entrepreneurship-based mathematics E-Module was declared valid with a percentage of the E-Module value of 92.88% in the "Very Eligible" category. Mathematics learning with the PBL model assisted by the E-Module mathematics based on entrepreneurship is stated to be (1) practical with a percentage of 86.9% of students and 96% of teachers falling into the "Very Practical" category; (2) effective based on the results of the posttest which showed that the experimental class achieved individual learning mastery of 75% with and achieved 75% classical learning completeness compared to the control class which did not achieve individual and classical learning mastery with grades . In addition, through the independent sample t test, it was found that the posttest results of the experimental class were better than the control class.

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1. Introduction

Mathematics is a subject that has a very important position in education. Mathematics underlies the development of technology, because it has an important role in various disciplines and advances human thinking so that mathematics is one of the subjects that must be studied at every level of education in Indonesia, both at the elementary/middle/high school/vocational school (*SD/SMP/SMA/SMK*) levels. One of the cognitive skills that must be possessed by students to master mathematics is the ability to solve mathematical problems (Mayrati et al., 2019). Mathematical problem solving ability is a priority in learning mathematics (Islamiah et al., 2018). Mathematical problem solving abilities help students learn to think at a higher level and reason and develop other mathematical thinking skills (Hendriana et al., 2017).

Students are said to have the ability to solve mathematical problems if they meet the indicators of problem solving ability. According to Hendriana and Sumarmo (2017) indicators of mathematical problem solving abilities, namely consisting of (1) students can identify data in the form of known, asked and adequacy; (2) students can determine the strategy used; (3) students are able to solve problems; (4) students are able to check the accuracy of the solutions obtained. With their mathematical problem solving abilities, students will be able to carry out the planned problem solving steps as according to Polya (Astutiani et al., 2019) that there are four steps in solving the problem, namely (1) understanding the problem; (2) problem

To cite this article:

Lidiana, V. & Sukestiyarno, Y. L. (2023). Development of Entrepreneurship-Based Mathematical E-Module and Its' Learning with PBL to Improve Students' Mathematical Problem Solving Ability. *Unnes Journal of Mathematics Education*, 12(1), 93-102. doi: 10.15294/ujme.v12i1.62911

solving planning; (3) implementing problem solving planning; (4) looking back at the completeness of problem solving.

The mathematical problem solving ability of vocational students in Indonesia is still relatively low, this is supported by research conducted by Pratiwi & Hidayati (2022) that the mathematical problem-solving ability of vocational students is still relatively low in terms of several factors, namely (1) students are not used to solving problems that begin by writing down known or asked; (2) students have not been able to plan well in defining and modeling problems; (3) many students still make mistakes in calculations; (4) students do not re-examine the results that have been obtained. Low levels of mathematical problem solving abilities are also often found in learning material on compositional functions and inverse functions.

Based on research conducted by Susanti & Lestari (2019) it was found that there were still difficulties experienced by class XI SMK students in solving problems of compositional functions and inverse functions caused by the inability to compose the given problem solving steps and lack of skills in operating compositional functions and inverse functions. The low ability to solve problems in the matter of compositional functions and inverse functions is certainly not solely due to students' internal errors during the process of learning mathematics. However, it is necessary to look at external factors that occur during the learning process. Based on Kamin, Andinny & Ramadani(2021)the low ability of students to solve problems of compositional functions and inverse functions is partly due to the teacher's teaching method which does not develop learning models. Even though the 2013 curriculum demands a change in the learning paradigm from teaching to learning, from teaching community to learning community.

One learning model that involves students in mathematics learning activities is Problem Based Learning (PBL). The Problem Based Learning learning model can improve teamwork and improve students' mathematical problem solving abilities (Siagian, Saragih, & Sinaga,(2019). This PBL model is suitable when combined with entrepreneurship in learning material on compositional functions and inverse functions because the ability to solve mathematical problems is closely related to the field of entrepreneurship. Research results from Odumosu & Gbenga (2015) states that there are several mathematical abilities that can support the development of entrepreneurship skills, namely numeracy skills, problem solving skills, creative thinking skills, innovative thinking skills, analytical skills and decision making skills. Teachers can integrate mathematics learning with entrepreneurship education by innovating learning both in terms of the methods and media used. One of the learning media that can be used in learning mathematics is the E-Module. E-Module is an electronic form of learning media that can be opened via a computer or mobile phone containing material that is arranged according to the competencies to be achieved (Ramadanti et al., 2021).

Based on the results of interviews with mathematics teachers at SMK Negeri 1 Lemahabang, Cirebon Regency, it was found that students' mathematical problem solving skills in learning mathematics were still relatively low because students still had difficulty understanding problems and determining the correct solution strategy in solving a problem. Besides that, according to one of the mathematics teachers at the school, there are still many students who still cannot apply problem solving if given new questions that have a different pattern from the previous questions. Even though according to the Regulation of the Minister of Education and Culture Number 34 of 2018, one of the competency standards for SMK graduates is having an understanding of mathematics in completing their tasks according to their expertise. The competency sub standards for SMK graduates are (1) to think mathematically related to their area of expertise; (2) using factual, conceptual and procedural knowledge of mathematics in solving problems according to their expertise logically, critically and creatively; (3) evaluating the accuracy and correctness of solving problems related to their expertise in using basic mathematics; (4) communicating the results of problem solving.

According to one mathematics teacher at the school, this low level of problem-solving ability is caused by a factor in the learning process. The learning process that has taken place is carried out online with material sources that have not been able to facilitate students in improving their mathematical problem solving abilities, this is because the teacher only provides material in the form of sheets containing only material points. The following is an image of an example sheet of material for compositional functions and inverse functions given by the mathematics teacher at SMK Negeri 1 Lemahabang, Cirebon Regency.

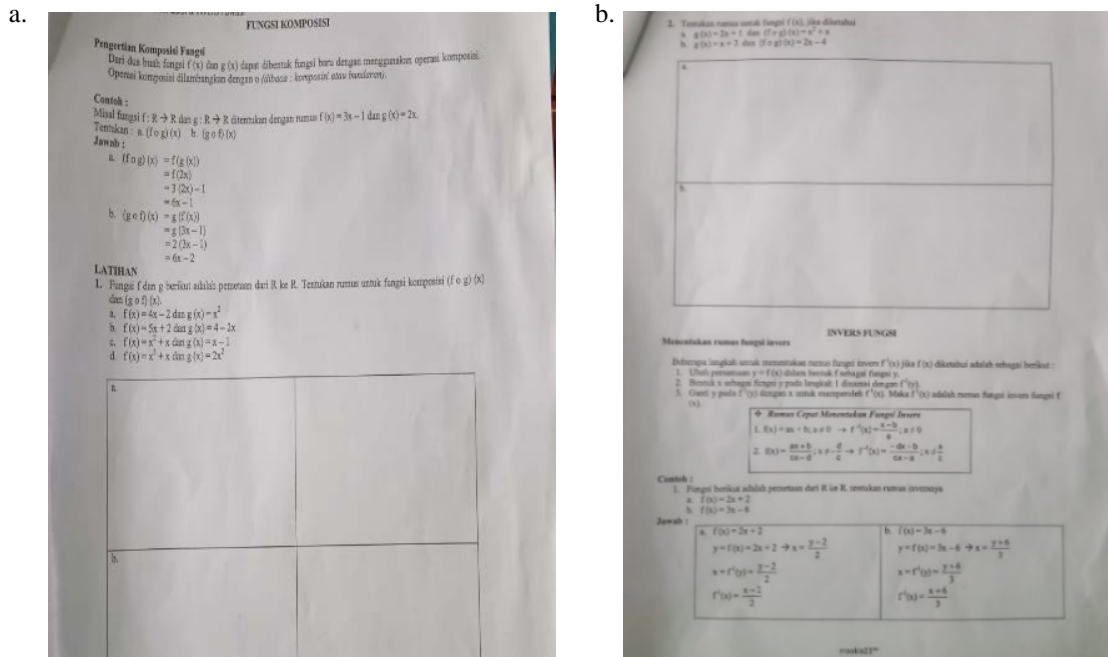


Figure 1. (a) Teacher's Composition Function Material Sheet; (b) Inverse Function Handout from the Teacher

The Covid-19 pandemic that has occurred in the last two years has caused changes in various aspects of life, including education. The learning process during this pandemic has mostly been carried out by means of distance learning (PJJ) or online. The implementation of online learning has not yet used media that is integrated with the field of entrepreneurship. Even though the integration of entrepreneurship education in learning mathematics has a great opportunity to be applied to SMK students. Because SMK graduates are prepared to become independent figures who are able to create jobs through the skills they already have. Therefore, to help the success of learning mathematics in SMK, in this case the researcher uses media in learning that can improve mathematical problem solving abilities and facilitate students to explore their abilities independently. The media referred to here is the E-Module.

This research focuses on the development of entrepreneurship-based mathematics E-Modules and their learning using the Problem Based Learning model. The developed e-module focuses on material compositional functions and inverse functions associated with entrepreneurship. Where the E-Module is prepared based on the steps of the Problem Based Learning model and contextual issues of entrepreneurship. The E-Module also contains basic entrepreneurship skills that refer to Ronald J. Ebert, namely: (1) technical skills; (2) human relations skills; (3) conceptual skills; and (4) decision making skills; (5) time management skills (Masduki & Kurniasih, 2019). This research will produce valid, practical and effective E-Modules and learning tools in the form of a syllabus and Learning Implementation Plan to improve students' mathematical problem solving abilities.

2. Methods

This research used the type of research development or Research and Development (R&D). This type of research was chosen because the researcher wanted to develop a learning product in the form of an E-Module and its learning tools. According to Borg and Gall, what is meant by the development research model is "a process use develop and validate educational product" that development research is a researcher's effort in developing and validating products used for the learning process (Yuliani & Banjarnahor, 2021). In this study using the ADDIE development model developed by Dick and Carey includes analysis, design, development, implementation, evaluation.

The design of this study used the Posttest-Only Control Group Design. According to Sukestiyarno (2021a) In this research design, two groups were randomly selected (R). The group that was given the treatment (X1) was called the experimental class while the group that was given the treatment (X2) was called the control class. The following Posttest-Only Control Group Design presented in Table 1 .

Table 1. Posttest-Only Control Group Design

Class	Treatment	Test
R1	X1	O1
R2	X2	O2

Information:

R1 = Experiment Class

R2 = Control Class

X1 = Learning uses E-Module based on entrepreneurship and learning uses the PBL model

X2 = Learning by lecture model

O1 and O2 = Posttest (Final Test)

The population of this study were all class XI students of SMK Negeri 1 Lemahabang, Cirebon Regency, for the 2021/2022 academic year, even semester, with a total of 16 classes. Based on sampling by means of simple random sampling because the members are taken randomly without regard to the existing strata in the population. Two classes were taken randomly, namely class XI TKJ 1 as the experimental class and class XI TKJ 2 as the control class. The experimental class was given treatment in the form of learning using the E-Module mathematics based on entrepreneurship with the PBL model, while the control class was only given the learning treatment that is usually applied by the teacher, namely lectures.

Data collection techniques in this study were in the form of tests and non-tests. The test is in the form of a posttest to measure students' mathematical problem solving abilities. While the non-test consists of interviews and questionnaires. The questionnaire consists of an analysis questionnaire for students' needs, a validation test questionnaire and a questionnaire for student responses and teacher responses. Interviews were conducted to obtain preliminary study data in the form of problems that occur in research sites such as the level of students' mathematical problem-solving abilities, learning media used and ongoing learning activities and needs in learning activities.

Student needs analysis questionnaires were conducted to determine student characteristics and needs that support student learning. The validation test questionnaire was used to test the feasibility of the entrepreneurship-based mathematics E-Module and its learning tools which were given to 2 mathematics lecturers and 1 mathematics teacher as validators. The data analysis technique for the due diligence of the E-Module and its learning tools is calculated using the following formula.

$$P = \frac{f}{N} \times 100\%$$

Information:

P : assessment presentation

f : score obtained

N : overall score (Wahyuni, 2020)

The criteria for the results of the E-Module validation test and learning tools are presented in the following Table 2.

Table 2. Criteria for Validation Test Results

Intervals	Criteria
$85\% < Skor \leq 100\%$	Very Eligible
$70\% < Skor \leq 85\%$	Eligible
$50\% < Skor \leq 70\%$	Decent Enough
$1\% < Skor \leq 50\%$	Not feasible

(Wahyuni, 2020)

Entrepreneurship-based e-modules and learning tools are said to be feasible if they get a score of 70%. If it is below 70%, then the entrepreneurship-based E-Module and its learning tools need to be revised again.

Student response questionnaires and teacher responses were used to test the practicality of learning mathematics with the PBL model assisted by the entrepreneurship-based mathematics E-Module. Data from student response questionnaires and teacher responses were then analyzed using the following formula.

$$\text{Response Percentage (R)} = \frac{\text{Total score of responses}}{\text{Number of respondents}} \times 100\%$$

Based on the results of the practicality test percentage, the criteria for the percentage of student and teacher responses can be categorized in the following Table 3.

Table 3. Criteria for Practical Test Results

Intervals	Criteria
$85\% < \text{Score} \leq 100\%$	Very Practical
$70\% < \text{Score} \leq 85\%$	Practical
$50\% < \text{Score} \leq 70\%$	Pretty Practical
$1\% < \text{Score} \leq 50\%$	Impractical

(Wahyuni, 2020)

The effectiveness of learning mathematics with the PBL model assisted by E-Module mathematics based on entrepreneurship can be known based on the posttest results of mathematical problem solving abilities. Mathematics learning with the PBL model assisted by E-Module mathematics based on entrepreneurship if it meets the hypothesis testing criteria includes (1) individual completeness test; (2) classical adequacy test; (3) a comparative test of students' mathematical problem solving abilities in the experimental class and the control class.

Individual completeness tests were carried out on the posttest scores of students in the experimental class and control class. Students are said to have completed individually if the student's posttest score reaches the mastery learning minimum, which is 70. Therefore, hypothesis testing for the first criterion is carried out using the One Sample T-test. The formula used to calculate the individual completeness posttest value of the experimental class and control class is the t test formula as follows.

$$t = \frac{\bar{x} - \mu_0}{\frac{s}{\sqrt{n}}}$$

Information:

t = t test,

\bar{x} = average Of Experimental Class,

μ_0 = minimum standard of completeness,

s = standard deviation, and

n = many students

The test criteria for individual adequacy test H_0 is accepted if $t_{count} > t_{table}$ the values with $\alpha = 0,05$ and $dk = n - 1$

The classical completeness test is used to determine the success of students in the experimental class in achieving learning completeness if 75% of students achieve a completeness score of 70. The formula used to calculate the classical completeness test is as follows.

$$z = \frac{\frac{x}{n} - \pi_0}{\sqrt{\frac{\pi_0(1 - \pi_0)}{n}}}$$

Information:

z =z test,

x =many students who pass the experimental class,

π_0 =expected proportion,

n =many students

The test criteria for the classical learning adequacy test H_0 is accept if $z_{count} > z_{table}$ the value is with $\alpha = 0,05$.

A comparison test was carried out to compare the posttest scores of the experimental class and the control class. Comparison test was carried out using the Independent Sample T-test. The formula used in this comparison test is as follows.

$$t = \frac{\bar{x}_1 - \bar{x}_2}{s \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}} \quad \text{with } s^2 = \frac{(n_1 - 1)s_1^2 + (n_2 - 1)s_2^2}{n_1 + n_2 - 2}$$

Information:

\bar{x}_1 = The average posttest value of the experimental class

\bar{x}_2 = The average posttest value of the control class

s_1^2 = Variance of experimental class posttest scores

s_2^2 = Variance of control class posttest values

n_1 = Many students of the experimental class

n_2 = Many control class students .

With $\alpha = 0,05$ then the test criteria H_0 is accept if $t_{count} < t_{table}$.

3. Results & Discussions

3.1. Analysis

The first stage carried out in this development research process is the analysis stage. At this stage of the analysis, the fundamental problems that occurred at SMK Negeri 1 Lemahabang, Cirebon Regency, were that the mathematical problem solving abilities of class XI students at SMK Negeri 1 Lemahabang, Cirebon Regency were still low, mathematics learning carried out still often used the lecture method even though the 2013 curriculum demanded a learning process where the center learning is students. In addition, the learning that has been carried out has not been linked to entrepreneurship, even though this entrepreneurship has a great opportunity to be associated with learning mathematics in vocational schools. In addition, there are no books or other teaching materials used in learning mathematics,

Based on this, the development of an entrepreneurship-based mathematics E-Module was carried out, because it is based on Permendikbud No.81A of 2013 concerning Implementation of the 2013 Curriculum states that one of the learning principles must be able to support the personal growth of students who have an entrepreneurial spirit (Aulia et al., 2020). Then so that the developed entrepreneurship-based mathematics E-Module can achieve the objectives to be achieved, namely increasing students' mathematical problem solving abilities, the entrepreneurship-based mathematics E-Module is combined with Problem Based Learning (PBL) model learning because it is based on research from Supriatna (2016) that learning the Problem Based Learning (PBL) model is able to develop students' mathematical problem solving abilities.

3.2. Design

The second stage of this development is the design stage, at the design stage the design and preparation of the entrepreneurship-based mathematics E-Module is carried out containing compositional function material and inverse functions as draft 1.



Figure 2. Display of Entrepreneurship-Based Mathematics E-Module

In addition, at this stage it also produces research instruments in the form of validation questionnaires, student and teacher response questionnaires, as well as posttest questions. Preparation of a validation test questionnaire using a Likert scale, consisting of answer options 1 (not feasible), 2 (fairly feasible), 3 (decent), 4 (very feasible). Preparation of student response questionnaires and teacher responses using a Likert scale, consisting of answer options for positive statements having a score of 1 (strongly disagree), score 2 (disagree), score 3 (disagree), score 4 (agree), score 5 (strongly agree). Whereas negative statements have a score of 1 (strongly agree), score 2 (agree), score 3 (disagree), score 4 (disagree), score 5 (strongly disagree) (Sukestiyarno, 2021).

The test instrument is used to measure students' mathematical problem solving abilities in the form of posttest questions. The indicators of students' mathematical problem solving abilities used in preparing tests of students' mathematical problem solving abilities refer to the opinions of Hendriana and Sumarmo (2017), namely as follows: (1) students can identify data in the form of known, asked and adequacy; (2) students can determine the strategy used; (3) students are able to solve problems; (4) students are able to check the accuracy of the solutions obtained.

3.3. Development

Entrepreneurship-based mathematics e-modules that have been compiled by researchers were tested for validation by validators consisting of 2 mathematics lecturers and 1 mathematics teacher using a validation test questionnaire. The results of the entrepreneurship-based mathematics E-Module validation test by 3 validators are presented in the following table 4.

Table 4. The results of the entrepreneurship-based mathematics E-Module validation test

Validators	Score (%)
Validators 1	98.16
Validators 2	90.6
Validators 3	89.93
Average (%)	92.88
Category	Very Eligible

Based on the results of the entrepreneurship-based mathematics E-Module validation test by 3 validators presented in table 2, it can be concluded that the entrepreneurship-based mathematics E-Module developed is valid with an average score percentage of the three validators of 92,88% and included in the category "Very Eligible ". The entrepreneurship-based mathematics e-module which has been declared valid contains the basic skills of entrepreneurship according to Ronald J.Ebert (Masduki & Kurniasih, 2019) namely (1) technical skills (skills in carrying out tasks), where in the entrepreneurship-based mathematics E-Module students are given assignments both individually and in groups containing contextual problems related to entrepreneurship so that students have an obligation to complete them, (2) human relations skills (skills to understand, understand and communicate with other people), where in the entrepreneurship-based math E-Module students are trained to collaborate with their classmates in completing assignments given in the E-Module, (3) conceptual skills (abstract thinking skills in facing challenges), where through the problems presented in this E-Module in the form of non-routine problems so that students are trained to be able to think more deeply in solving these problems, (4) decision making skills, (skills for formulating problems) with the tasks in the E-Module given to students, students are trained to be able to decide on a problem solving strategy that must be done to complete the task; (5) time management skills (skills to use time as productively as possible), with the problems given in this E-Module students and their groups are trained so that they can make the best use of time to solve the given problems.

The entrepreneurship-based math E-Module that was developed supports the Problem Based Learning (PBL) learning process because the problems given in this E-Module must be solved by discussing in groups. The problems given in the E-Module contain solutions in more than one way so that they are suitable for implementation with PBL. The material for compositional functions and inverse functions in the entrepreneurship-based mathematics E-Module is presented with entrepreneurship narratives that raise successful entrepreneurial figures so that when students read the entrepreneurship-based mathematics E-Module this is motivated and an entrepreneurial character emerges in students. Entrepreneurship-based mathematics e-module which contains material on compositional functions and inverse functions is presented in the form of a soft file in pdf format. which is then shared with students via a link. This was chosen because it is easier for students to access via cellphones or computers because there is no need to download an application to use it so it saves more storage space.

3.4. Implementation

This valid entrepreneurship-based mathematics e-module was then implemented in the experimental class, namely class XI TKJ 1 SMK Negeri 1 Lemahabang, Cirebon Regency, which consisted of 36 students. Entrepreneurship-based mathematics e-module is implemented using the Problem Based Learning (PBL) learning model. The entrepreneurship-based mathematics E-Module is distributed to students via a bit.ly link where students are then directed to solve the non-routine problems given in this E-Module by way of groups based on PBL steps with teacher guidance. After the implementation is complete, a practicality test of learning mathematics is carried out with the PBL model assisted by the E-Module mathematics based on entrepreneurship. The practicality test was carried out through a student and teacher response questionnaire which was distributed to 36 experimental class students and 1 math teacher. Based on the results of the questionnaire analysis of student and teacher responses to learning mathematics with the entrepreneurship-based PBL model, it was found that mathematics learning with the entrepreneurship-based PBL model was declared "Very Practical" by students with an average percentage of 86,9% and by teachers with an average percentage of 96 %. This means that learning mathematics with the PBL model assisted by the E-Module in mathematics based on entrepreneurship has received a positive response from students and teachers, because it is based on Nasution (2016) that learning is said to be practical if in the field it gets a positive response from students and teachers.

3.5. Evaluation

This stage is carried out by evaluating learning using the posttest of mathematical problem solving abilities. Posttest is given to the experimental class and control class. After being analyzed that the experimental class achieved individual completeness with scores $t_{count} = 12.7 > t_{table} = 1.68$ with students who achieved individual learning mastery with mastery learning minimum score 70 as many as 34 students out of 36 students. In addition, the experimental class also achieved 75% classical learning completeness with scores $z_{count} = 2.69 > z_{table} = 1.73$. This means that the percentage of students in the experimental

class who scored ≥ 70 achieved 75% or more. Whereas in the control class the results of the posttest scores did not reach individual mastery and classical mastery with scores $t_{count} = -3.32 < t_{table} = 1.68$ and $z_{count} = -5.138 < t_{table} = 1.73$ with students who had not achieved individual learning mastery with mastery learning minimum score 70 as many as 22 students out of 36 students. Posttest scores from the control class and the experimental class were also carried out Independent sample t test to compare the posttest values of the control class and the experimental class. The results of the posttest comparative test for the control class and the experimental class show that the mathematical problem solving abilities of the experimental class students were better than the mathematical problem solving abilities of the control class students who did not use the entrepreneurship-based mathematics E-Module and their learning was with the PBL model with the acquisition of grades with scores $t_{count} = 10.7 > t_{table} = 1.68$.

Research Septyani et.al (2019) entitled "Development of Bilingual Pictorial Module Mathematics Learning Media Based on Entrepreneurship in Social Arithmetic". This research was conducted to determine the validity and practicality of entrepreneurship-based illustrated bilingual math modules on social arithmetic material with the ADDIE development model. The results of the research are in the form of validation values from material experts with an average percentage of 90.9%, media experts with an average percentage value of 90.7% and linguists with an average percentage value of 89.7% with an interpretation of the test eligibility with the criteria of "Very Eligible". As well as student and teacher responses to the developed module, the results with very interesting interpretation criteria were obtained. In his research, product implementation was not carried out in real class conditions to test its effectiveness as was done in this study where the entrepreneurship-based mathematics E-Module was implemented in class by learning using the Problem Based Learning (PBL) model. So that through the posttest conducted in the experimental class and the control class it was found that the entrepreneurship-based mathematics E-Module and its learning with the Problem Based Learning (PBL) model were effective in increasing students' mathematical problem solving abilities. So this research is better than previous research.

The strength of this research is that the entrepreneurship-based mathematics E-Module in the matter of compositional functions and inverse functions is combined with learning using the Problem Based Learning (PBL) model. By combining the entrepreneurship-based mathematics E-Module and the Problem Based Learning (PBL) learning model, this becomes a very interesting combination to improve students' mathematical problem solving abilities. Because entrepreneurship is closely related to problem solving skills, according to Mary Olukemi & Ezekiel Gbenga (2015) that one of the abilities that can support entrepreneurship is the ability to solve mathematical problems. In addition, according to research from Supriatna (2016) that the learning model of Problem Based Learning (PBL) is one of the learning models which, when associated with entrepreneurship, can develop students' mathematical problem solving abilities. With the advantages of the entrepreneurship-based mathematics E-Module that has been described previously, besides being effective in increasing students' mathematical problem-solving abilities, it is also effective in motivating students in forming students' entrepreneurship spirit through the basic skills contained in this entrepreneurship-based mathematics E-Module.

4. Conclusion

Based on the development research that has been done, it can be concluded right that (1) The entrepreneurship-based mathematics e-module is declared valid with the results of validation by 3 validators with an average percentage of 92.88% and is included in the "Very Eligible" category. (2) Learning mathematics using the Problem Based Learning (PBL) model assisted by E-Module based mathematics on entrepreneurship is stated to be practical with an average percentage of practicality scores of 86.9% of students and 96% of teachers and is included in the "Very Practical" category. (3) Learning mathematics using the Problem Based Learning (PBL) model assisted by E-Module mathematics based on entrepreneurship is declared effective based on the posttest results of the experimental class which obtain individual and classical mastery with scores $t_{count} = 12.7 > t_{table} = 1.68$ and $z_{count} = 2.69 > z_{table} = 1.73$ compared to control classes that did not achieve individual and classical mastery with scores $t_{count} = -3.32 < t_{table} = 1.68$ and $z_{count} = -5.138 < z_{table} = 1.73$. As well as based on comparative tests the posttest value of the experimental class and the control class obtained that the mathematical problem solving abilities of the experimental class students were better than the control class students' mathematical problem solving abilities with the acquisition of grades $t_{count} = 10.7 > t_{table} = 1.68$.

References

- Astutiani, R., Isnarto, & Hidayah, I. (2019). Kemampuan Pemecahan Masalah Matematika dalam Menyelesaikan Soal Cerita Berdasarkan Langkah Polya. *Seminar Nasional Pascasarjana 2019*.
- Aulia, A., Suarman, & Nasir, M. (2020). Implementasi Pembelajaran Kewirausahaan dalam Menumbuhkembangkan Karakter Kewirausahaan pada Siswa di SMK Negeri Pertanian Terpadu Provinsi Riau. *Jurnal Manajemen Pendidikan, 4*, 1–10.
- Hendriana, H., Rohaeti Eti, E., & Sumarmo, U. (2017). *Hard skills dan soft skills matematik siswa*. Refika Aditama.
- Hendriana, H., & Soemarmo, U. (2017). *Penilaian Pembelajaran Matematika*. PT Refika Aditama.
- Islamiah, N., Purwaningsih, W. E., Akbar, P., & Bernard, M. (2018). Analisis Hubungan Kemampuan Pemecahan Masalah Matematis Dan Self Confidence Siswa SMP. *Journal On Education, 1*(1), 47–57.
- Kamin, V. A., Andinny, Y., & ... (2021). Analisis Kemampuan Pemahaman Konsep Matematika Materi Fungsi Komposisi Dan Invers Kelas X. ... *Pendidikan Matematika, 189–200*. <http://www.proceeding.unindra.ac.id/index.php/DPNPMunindra/article/view/5550>
- Mary Olukemi, O., & Ezekiel Gbenga, O. (2015). Relevance of Mathematics Education to Entrepreneurship Skills Acquisition towards the Realization of Vision 20:2020. *International Journal for Cross-Disciplinary Subjects in Education, 7*(2), 2768–2773. <https://doi.org/10.20533/ijcdse.2042.6364.2016.0377>
- Masduki, L. R., & Kurniasih, E. (2019). Penerapan Pembelajaran Entrepreneur Berbasis Matematika. *JIPMat, 4*(1), 28–37. <https://doi.org/10.26877/jipmat.v4i1.3663>
- Mayratih, G. E., Leton, S. I., & Uskono, I. V. (2019). Pengaruh Disposisi Matematis Terhadap Kemampuan Pemecahan Masalah Matematis Siswa. *Asimtot : Jurnal Kependidikan Matematika, 1*(1), 41–49. <https://doi.org/10.30822/asimtot.v1i1.97>
- Nasution, A. (2016). Pengembangan Modul Matematika Berbasis Masalah untuk Meningkatkan Kemampuan Pemecahan Masalah Matematika Siswa. In *Jurnal Pendidikan dan Kependidikan* (Vol. 1, Issue 1).
- Pratiwi, R., & Hidayati, N. (2022). Kemampuan Pemecahan Masalah Matematis Siswa Kelas XI SMK Berdasarkan Tahapan Polya. *Jurnal Educatio FKIP UNMA, 8*(1), 256–263. <https://doi.org/10.31949/educatio.v8i1.1978>
- Ramadanti, F., Mutaqin, A., & Hendrayana, A. (2021). Pengembangan E-Modul Matematika Berbasis PBL (Problem Based Learning) pada Materi Penyajian Data untuk Siswa SMP. *Jurnal Cendekia : Jurnal Pendidikan Matematika, 5*(3), 2733–2745. <https://doi.org/10.31004/cendekia.v5i3.759>
- Septyani, R., Salim, A., Rakhmawati, R., & Masykur, R. (2019). Pengembangan Media Pembelajaran Matematika Modul Bilingual Bergambar Berbasis Kewirausahaan Pada Aritmetik Sosial. *Journal of Mathematics Education and Science, 2*(1), 1–9. <https://doi.org/10.32665/james.v2i1.46>
- Siagian, M. V., Saragih, S., & Sinaga, B. (2019). Development of Learning Materials Based on Realistic Mathematics Education Approach to Improve Students' Mathematical Problem Solving Ability and Self-Efficacy. *International Electronic Journal of Mathematics Education, 14*(2), 331–340.
- Sukestiyarno, Y. (2021a). *Metode Penelitian Pendidikan*. Alem Print.
- Sukestiyarno, Y. (2021b). *Olah Data Deskriptif dan Inferensial (Teori dan Praktek)*.
- Supriatna, H. (2016). Pembentukan Kemampuan Literasi Matematika dan Jiwa Kewirausahaan pada Pembelajaran Matematika Model Problem Based Learning Berpendekatan *PRISMA, Prosiding Seminar Nasional Matematika, 2014*, 203–216. <https://journal.unnes.ac.id/sju/index.php/prisma/article/view/21459>
- Susanti, B., & Lestari, Y. A. P. L. (2019). Menyelesaikan Soal Fungsi Komposisi dan Fungsi. *01*(03), 446–459.
- Wahyuni, A. (2020). Jurnal Pendidikan Matematika. *Jurnal Pendidikan Matematika, 11*(1), 67–76. <http://ojs.uho.ac.id/index.php/jpm>
- Yuliani, W., & Banjarnahor, N. (2021). Metode Penelitian Pengembangan (Rnd) dalam Bimbingan dan Konseling. *Quanta, 5*. <https://doi.org/10.22460/q.v2i1p21-30.642>