

## Student Activity Sheets based on Scientific and Problem Based Learning (PBL) in the Introduction to Microeconomics course: How and Why?

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**Abstract:** Economics is the study of how humans choose and create wealth. Through economics, humans can think and make decisions in allocating their resources appropriately. The limited availability of the variety of questions used in microeconomics courses has encouraged researchers to compile scientific-based Student Activity Sheets (LKM) and Problem Based Learning (PBL). The purpose of this study is to describe (1) feasibility, (2) effectiveness, and (3) practicality of developing scientific-based Student Activity Sheets (LKM) and Problem Based Learning (PBL) in the Introduction to Microeconomic Theory course. This type of research is development research adopted the Borg and Gall (1983) model. The trial subjects in this development research were 20 students (1 class) of the economic education study program. The data collected with two questionnaire, MFI validation sheet and student response sheet; and the post-test. all data that has been collected is processed by descriptive qualitative method using percentage criteria. The results showed that the percentage of development feasibility was 94% in the very feasible category, the percentage of effectiveness showed that students obtained a learning mastery score above 75% in the effective and complete category, and the practicality percentage obtained a score of 99.5 in the practical category. It can be concluded that the development of the Student Activity Sheet is feasible to apply.

**Keywords:** Student Activity Sheets, Scientific approach, Problem Based Learning, Microeconomics Course

**Abstrak:** Ekonomi adalah studi tentang bagaimana manusia memilih dan menciptakan kekayaan. Melalui ilmu ekonomi, manusia dapat berpikir dan mengambil keputusan dalam mengalokasikan sumber dayanya secara tepat. Keterbatasan variasi soal yang digunakan dalam mata kuliah ekonomi mikro mendorong peneliti untuk menyusun Lembar Kegiatan Mahasiswa (LKM) dan Pembelajaran Berbasis Masalah (PBL) berbasis ilmiah. Tujuan penelitian ini adalah untuk mendeskripsikan (1) kelayakan, (2) efektivitas, dan (3) kepraktisan pengembangan Lembar Kegiatan Siswa (LKM) dan Pembelajaran Berbasis Masalah (PBL) berbasis ilmiah pada mata kuliah Pengenalan Teori Ekonomi Mikro. Jenis penelitian ini adalah penelitian pengembangan yang mengadopsi model Borg and Gall (1983). Subjek uji coba dalam penelitian pengembangan ini adalah 20 mahasiswa (1 kelas) program studi pendidikan ekonomi. Pengumpulan data dilakukan dengan dua angket, lembar validasi LKM dan lembar respon siswa; dan post-test. semua data yang telah terkumpul diolah dengan metode deskriptif kualitatif dengan menggunakan kriteria persentase. Hasil penelitian menunjukkan bahwa persentase kelayakan pengembangan 94% dalam kategori sangat layak, persentase efektivitas menunjukkan siswa memperoleh nilai ketuntasan belajar di atas 75% dalam kategori efektif dan tuntas, dan persentase kepraktisan memperoleh skor 99,5 dalam kategori praktis. Dapat disimpulkan bahwa pengembangan LKS ini layak untuk diterapkan.

**Kata Kunci:** Lembar Kerja Mahasiswa, Pendekatan saintifik, Model Pembelajaran Berbasis Masalah, Matakuliah Mikroekonomi

## INTRODUCTION

The scientific approach is one of the methods in developing students' character, knowledge and capabilities/skills (Falloon et al., 2020; Poulou, 2007). With a scientific approach in teaching and learning activities, students are able to have critical, scientific and analytical thinking skills (Ristanto et al., 2020; Syaiful et al., 2021; Lestari et al., 2018). These capabilities or skills can be achieved because of the steps of the scientific approach in the form of recognizing problems, creating problem formulations, proving hypotheses, collecting data (experiments), analyzing data, compiling conclusions and publishing them (Windschitl, 2004). The benefits that students get from the scientific approach, among others, are that students can investigate a problem, instill (curiosity) or want to know and can also develop concepts from a learning experience/knowledge that has been done. The scientific approach (scientific approach) is a learning model that uses scientific principles that contain a series of data collection activities through observation, questioning, experimentation, processing information or data, then communicating (Kemendikbud, 2014). The purpose of the scientific approach in learning is to improve students' thinking skills, form the ability to solve problems systematically, create learning conditions so that students feel that learning is a necessity, train students in expressing ideas, improve student learning outcomes, and develop the character of students (Sani, 2015). Hosnan (2014) states that the scientific approach has the following characteristics: 1) Student-centered; 2) Involving science process skills in constructing concepts, laws or principles; 3) Involving cognitive processes that have the potential to stimulate intellectual development, especially students' higher order thinking skills, and; 4) Can develop students' character.

In scientific learning, the learning process is expected to be directed to train analytical thinking (students are taught how to make decisions) not mechanistic thinking (routinely by just listening and memorizing only) (Majid, 2014). Rusman (2015) states that the scientific approach is a learning approach that provides broad opportunities for students to explore and elaborate on the material being studied, in addition to providing opportunities for students to actualize their abilities through learning activities designed by the teacher. Furthermore, Hosnan (2014) states that the scientific approach is a learning process designed so that students actively construct concepts, laws, or principles through observing, formulating problems, proposing/formulating hypotheses, collecting data with various techniques, analyzing data, drawing conclusions, and communicate. Karar and Yenice (2012) also mention that the scientific approach is a learning process designed in such a way that learners actively construct concepts, laws or principles through the stages of observing (to identify or find problems), formulate problems, formulate hypotheses, collect data by various techniques, analyze data, draw conclusions, and communicate concepts, laws or principles found.

Problem Based Learning (PBL) is a learning model based on the principle of using problems as a starting point for the acquisition and integration of new knowledge. This learning model basically refers to other cutting-edge learning such as project-based instruction, experience-based instruction, authentic instruction, and meaningful learning. In contrast to discovery learning (inquiry-discovery) which emphasizes more on academic problems. In Problem Based Learning (Problem Based Learning), problem solving is defined as a process or effort to get a task completion or situation that is really real as a problem by using known rules (Amir, 2007). The implementation of learning using a scientific approach and problem-based learning requires the creativity of teachers in creating a conducive learning atmosphere and teaching materials that can support the learning process. One of these teaching materials is the Student Activity Sheet.

Krisdiana, et al (2019) in their research stated that the development of Student Worksheets was valid and practical for use in mathematical statistics courses. Furthermore, Djalal, et al. (2017) stated that the development of Problem-Based Algebraic LKM to Optimize Mathematical Reasoning Ability of Mathematics Education Students was in the good category and was suitable for use, and Winarni (2020) based on his research, stated that the implementation results showed that the use of Student Worksheets could encourage students to: have meaningful knowledge, (b)

enjoy Data Analysis courses and the learning methods it uses, be motivated to learn and solve problems and projects in Student Worksheets independently, be active during lectures.

The development of student activity sheets based on scientific approaches and problem based learning (PBL) is based on the situation (1) there is no structured student activity sheet to practice problem solving skills, the student activity sheets currently available still contain one material, namely demand and supply material (2 ) limited variety of questions in learning, (3) students are familiar with practice questions at levels C1 (knowledge), C2 (understanding), and C3 (application), so that when they are faced with analytical or complex practice questions, they experiencing confusion, and (3) there is a contextual-based introductory textbook for microeconomic theory, to complement the book, it is necessary to practice questions contained in the LKM so that students are able to understand the theory and as a measure of the level of understanding of students. Hence, it is necessary to develop the Student Activity sheets in the introductory course in Microeconomic Theory by using a scientific approach and a problem-based learning model (PBL). Thus, through the preparation of this development, it is expected to provide scientific-based and problem-based assessment instruments that can facilitate students in understanding the concepts of economics contained in the Introduction to Microeconomic Theory course.

## METHOD

The Student Activity Sheet (LKM) development model in this study uses the development of the [Borg & Gall \(1983\)](#) development model which consists of 10 (ten) stages (see [Figure 1](#)), namely: 1) research and information collecting, 2) planning, 3) develop preliminary form of product, 4) preliminary field testing, 5) main product revision, 6) main field testing, 7) operational product revision, 8) operational field testing, 9) final product revision, and 10) dissemination and implementation. The content of this LKM based on Introduction to Microeconomic Theory syllabus. This syllabus developed by lecturers of macroeconomic course in Economic Education Program, Universitas Negeri Surabaya, Indonesia. The syllabus can be seen in [Table 1](#).

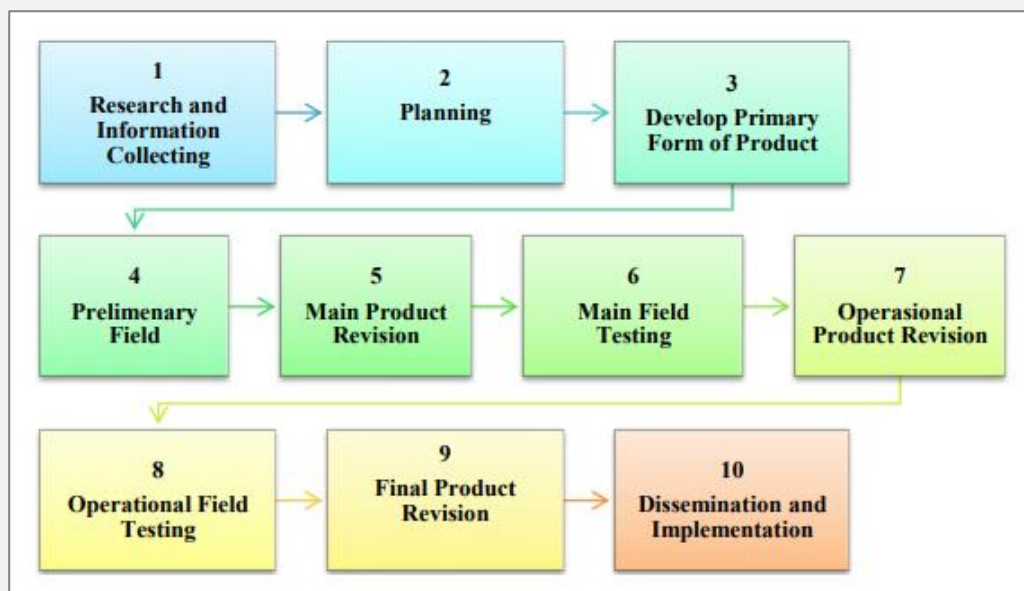


Figure 1. Flow chart Borg & Gall Model ([Borg & Gall, 1983](#))

Table 1. Final ability formulation in Introduction to Microeconomic Theory

Final Ability	Indicator
1. Describe the basic concepts of microeconomic theory	1.1. Explaining the Position of Microeconomics 1.2. Identifying the scope of Microeconomic Theory 1.3. Explain the assumptions of microeconomic theory 1.4. Mention Tool Theory analysis 1.5. Microeconomics 1.6. Distinguishing positive economics and normative economics
2. Able to analyze the emergence of economic problems	2.1. Analyzing Scarcity 2.2. explain opportunity cost 2.3. Describing the Production Possibility Curve 2.4. Describe three main economic problems
3. Able to describe economic activities	3.1. Describe the process of production, distribution and consumption activities 3.2. Identify the perpetrator-perpetrator economic activity 3.3. Describe the flow and process in circular flow
4. Analyze demand and supply	4.1. Describing supply and demand 4.2. Explain Law demand and supply 4.3. Explain the factors-factor which influence demand and supply 4.4. Make query table and offers 4.5. Make curve request and offers 4.6. Counting function demand and supply
5. Analyzing the mechanism of market price formation	5.1. Analyzing the formation of market prices if the situation is <i>ceteris paribus</i> 5.2. Describes the process of forming market prices in the event of excess demand or excess supply. 5.3. Describe the formation of market prices if there are changes in conditions 5.4. Describe with a picture the process of forming market prices if a time period is entered
6. Ability to determine various coefficient of elasticity and detect the type of goods based on the coefficient of elasticity	6.1. Calculating the coefficient of elasticity of demand with various concepts 6.2. Describe the factors that determine the elasticity of demand for goods 6.3. Calculating the coefficient of elasticity of supply with various concepts 6.4. Describe the factors that determine the elasticity of supply 6.5. Calculating the cross-demand elasticity coefficient for detects the relationship between two items. 6.6. Calculating the income elasticity coefficient to detect the nature of goods
7. Analyze government pricing policy	7.1. Describing with the lowest retail pricing policy curve 7.2. Describing with the highest retail pricing policy curve 7.3. Describing with a policy curve International Quota 7.4. Describing the Tax policy curve 7.5. Describing with wisdom curve Subsidy
8. Identify the types of markets	8.1. Identify market characteristics 8.2. Describe the various markets 8.3. Distinguishing market types according to their structure
9. Analyze production costs	9.1. Explain the meaning of production costs 9.2. Explain the components of production costs

Source: Syllabus of Introduction to Microeconomic Theory Course, 2021

### Design of trial

This trial was carried out in 3x50 minutes. By means of a one-shot case study (Purwanto and Rakhmawati, 2016) which was tested in 1 class (20 students) with a post test in the form of practice questions contained in the Student Activity Sheet (see figure 2).

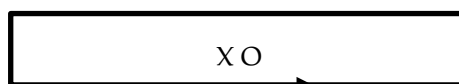


Figure 2. one-shot case study

### Data Collection Instruments

Instruments of data collection were carried out by questionnaires which were divided into:

- 1) MFI validation sheet (materials, learning evaluation experts, language, graphics). The indicators used in the material review and media experts include aspects of material feasibility, language, presentation, media effects on learning strategies, and overall display aspects.
- 2) Student response sheet. The question indicators are adjusted to the indicators contained in the Introduction to Microeconomic Theory material including scarcity, economic problems, opportunity costs, demand and supply, government price policies, circular flow diagrams, markets based on their structure, and production costs.
- 3) Post test

After getting a percentage of the eligibility criteria, the media eligibility criteria can be determined with the following table.

Table 1. The Media Eligibility Criteria

Percentage	Interpretation Criteria
0% - 20%	Very Inappropriate
21% - 40%	Not feasible
41% - 60%	Moderate
61% - 80%	Appropriate
81% - 100%	Very Appropriate

Source: adapted [Riduwan \(2016\)](#)

1. Analysis of Student Response Results (practical) to the development of LKM

Data that obtained from questionnaires were analyzed by using the formula below:

$$P = \frac{\sum x}{\sum xi} \times 100\% \quad (1)$$

2. Post-test analysis is used to support the feasibility of the Student Activity Sheet with the Minimum Completeness Criteria applicable to the class, namely 75 with B+ criteria.

The analysis of student learning outcomes after using the LKM is to calculate the percentage of student mastery by using the formula:

$$\text{Percentage of completeness (x)} = \frac{\text{Number of students who completed} \times 100\%}{\text{The number of students}} \quad (2)$$

## RESULTS AND DISCUSSION

### Development of scientific-based Student Activity Sheets (LKM) and Problem Based Learning (PBL) in Introduction to Microeconomic Theory

MFI development is carried out in accordance with the stages of the Borg & Gall (1983) development model which consists of 10 (ten) stages, namely: 1) research and information collecting, 2) planning, 3) develop preliminary form of product, 4) preliminary field testing, 5) main product revision, 6) main field testing, 7) operational product revision, 8) operational field testing, 9) final product revision, and 10) dissemination and implementation. The feasibility of developing an MFI includes the results of a review of material experts, media experts descriptively and quantitatively. The results of the descriptive study were obtained from inputs, suggestions, and

comments from the validators of media experts and material experts, while the quantitative studies were obtained from the scores given by the validators on each of the indicators contained in the material and media expert review instruments. Based on the results of the study, a score of 92% was obtained in the very appropriate category and a score of 94% in the very appropriate category in the study of material and media studies. The indicators used in the material review and media experts include aspects of material feasibility, language, presentation, media effects on learning strategies, and overall display aspects.

Based on the interpretation criteria, the minimum module that can be said to be appropriate and ready to be tested is 61%. Based on the validation table (see Table 1) carried out by media experts with the components of the criteria for scientifically based LKPD and problem-based learning including language, presentation, media effects on learning and overall appearance, the percentage results are 94% which can be concluded that Student is declared very suitable for use.

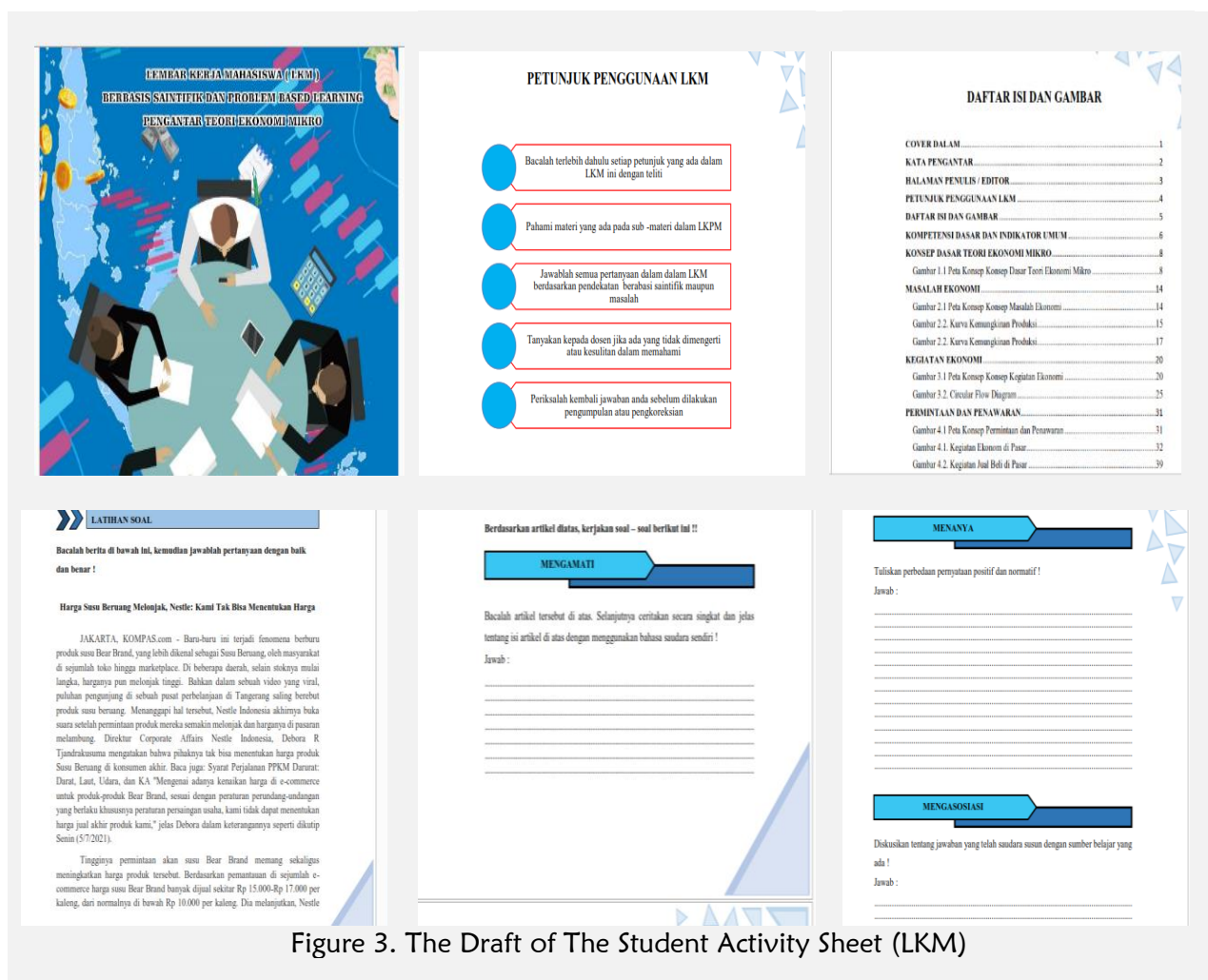


Figure 3. The Draft of The Student Activity Sheet (LKM)

After doing validation on every aspect which includes material and media aspects. The percentage scores are combined into one to assess the feasibility of Student activity sheet based on scientific and problem-based learning. The results of these calculations can be seen that the validity value of the media validation of the Student activity sheet developed is 93% or if interpreted, Scientific-based worksheets and problem-based learning developed are very feasible to use. The draft of the worksheet can be seen in Figure 3. From the conclusion of the interpretation, the

research can be continued at the implementation or trial stage. Based on the analysis of material experts and media experts, an average score of 93% was obtained in the very appropriate category.

This study relevant with the previous study from [Krisdiana, et al. \(2019\)](#), [Gultom \(2015\)](#), [Divrania \(2021\)](#), [Prisiska \(2017\)](#) and [Jalal & Afandi \(2017\)](#). The suggestions given by the material experts are (1) Evaluation includes cognitive, affective and psychomotor according to tiered levels, (2) several concepts such as normative economics need to be adjusted, and (3) the question needs to be given an appropriate operational verb and mentions the level required have to be measured. overall, the development of MFIs is very feasible to be applied in the learning process.

### **The Effectiveness of Scientific-Based MFI Development and Problem Based Learning (Learning Outcomes)**

The effectiveness of scientific-based and Problem Based Learning (PBL) LKM in the Introduction to Microeconomic Theory course is seen from the value of learning outcomes obtained by students. The learning outcomes were measured through written questions in the form of multiple choice of 10 (ten) questions. The question indicators are adjusted to the indicators contained in the Introduction to Microeconomic Theory material including scarcity, economic problems, opportunity costs, demand and supply, government price policies, circular flow diagrams, markets based on their structure, and production costs. Based on the results of student learning analysis by conducting trials with 20 students, obtained a completeness score of 75 percent with 15 (fifteen) students completed and 5 (five) incomplete students. Therefore, it can be stated that the development of this LKM is effective to use because the average student achieves a minimum completeness score and obtains an average learning outcome with the category A- value. This result showed that enhancing Student Activity Sheets based on Scientific and Problem Based Learning (PBL) in the Introduction to Microeconomics course has opportunity to increase the student's motivation to solve the problem and increase student achievement exponentially. This study in line with previous study of [Winarni \(2020\)](#) that found that that the use of Student Worksheets could encourage students to: have meaningful knowledge, (b) enjoy Data Analysis courses and the learning methods it uses, be motivated to learn and solve problems and projects in Student Worksheets independently, be active during lectures. The average student who has not completed has not been able to answer questions regarding Opportunity cost or opportunity costs and economic problems.

### **Practicality of Scientific-Based Student Activity Sheet (LKM) and Problem Based Learning (PBL) in Introduction to Microeconomic Theory**

The practicality of scientific-based LKM and Problem Based Learning (PBL) in the Introduction to Microeconomic Theory course is obtained from the results of student responses. The student responses include aspects (1) Appearance (animation, writing, pictures, colors) on the LKM, (2) interest in studying the material for Scientific Stages and Problem Based Learning in carrying out the problem solving process to drawing conclusions and presenting the results of the discussion (3) Appearance (writing, pictures, colors) LKM, (4) The language used in the LKM, (5) Contextual problems presented in the LKM (6) A series of tasks presented in the LKM, (7) Collaboration in groups to solve a problem in presenting ideas for solving problems / problems, (8) response to the teacher in providing instructions or guidance when having difficulty finding solutions to problems/questions. (9) feelings when participating in activities in the learning process using the stages in the scientific approach and Problem Based Learning (PBL). Based on the results of the analysis of student responses, obtained a score of 99.5% (agree). Based on these scores, students are interested in using scientific-based MFIs and Problem Based Learning in introductory courses in Microeconomic Theory.

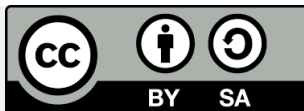
## CONCLUSION

1. The development of scientific-based Student Activity Sheets (LKM) and Problem Based Learning (PBL) in the Introduction to Microeconomic Theory course is feasible to use
2. Scientific-based Student Activity Sheets (LKM) and Problem Based Learning (PBL) in the Introduction to Microeconomic Theory are effective to use
3. Scientific-based Student Activity Sheets (LKM) and Problem Based Learning (PBL) in the Introduction to Microeconomic Theory are practical to use

## References

- Amir, T. (2007). *Karakteristik Proses Pembelajaran Berbasis Masalah*. Jakarta: PT Prestasi Pustakarya.
- Andres, A. (2008). *Advantages of Problem Based Learning Model*. Jakarta: PT Rineka Cipta.
- Borg, W. R., & Gall, M. D. (1983). *Educational research, an introduction*. New York and London: Longman Inc.
- Divrania, R. (2021). Pengembangan Lembar Kerja Siswa (LKS) berbasis pendekatan saintifik dengan model problem-based learning pada materi bangun ruang sisi datar untuk siswa SMP kelas VIII. *SKRIPSI Mahasiswa UM*.
- Falloon, G., Hatzigianni, M., Bower, M., Forbes, A., & Stevenson, M. (2020). Understanding K-12 STEM education: a framework for developing STEM literacy. *Journal of Science Education and Technology*, 29(3), 369-385. <https://doi.org/10.1007/s10956-020-09823-x>
- Gultom, E. (2015). *Pengembangan bahan ajar inovatif dan interaktif melalui pendekatan saintifik pada pengajaran termokimia* (Doctoral dissertation, UNIMED).
- Hosnan, M. (2014). Pendekatan saintifik dan kontekstual dalam pembelajaran abad 21: Kunci sukses implementasi kurikulum 2013.
- Jalal, A., & Afandi, A. (2017). Pengembangan Lembar Kegiatan Mahasiswa (LKM) Aljabar Berbasis Masalah untuk Mengoptimalkan Kemampuan Penalaran Matematis Mahasiswa Pendidikan Matematika. *Delta-Pi: Jurnal Matematika dan Pendidikan Matematika*, 6(2).
- Karar, E. E., & Yenice, N. (2012). The investigation of scientific process skill level of elementary education 8th grade students in view of demographic features. *Procedia-Social and Behavioral Sciences*, 46, 3885-3889. <https://doi.org/10.1016/j.sbspro.2012.06.166>
- Kemendikbud. (2014). *Permendikbud Nomor 103 Tahun 2014 tentang Standar Proses Pendidikan Dasar dan Menengah*. Jakarta: Kemendikbud
- Krisdiana, I., Masfingatin, T., & Murtafiah, W. (2019, March). Pengembangan Lembar Kerja Mahasiswa untuk Meningkatkan Keterampilan Berpikir Kreatif dalam Mengajukan Masalah. In *Prosiding Seminar Nasional Hasil Penelitian LPPM Universitas PGRI Madiun* (pp. 490-494).
- Lestari, T. P., Sarwi, S., & Sumarti, S. S. (2018). STEM-based Project Based Learning model to increase science process and creative thinking skills of 5th grade. *Journal of primary education*, 7(1), 18-24. <https://doi.org/10.15294/JPE.V7I1.21382>
- Majid, A. (2014). *Implementasi Kurikulum 2013: Kajian Teoritis dan Praktis*. Bandung: Interes Media.

- Prisiska, R. N., Hapizah, H., & Yusuf, M. (2017). Pengembangan lks berbasis problem-based learning materi aritmetika sosial kelas VII. *JPPM (Jurnal Penelitian dan Pembelajaran Matematika)*, 10(2). <http://dx.doi.org/10.30870/jppm.v10i2.2033>
- Purwanto, J., & Rakhmawati, L. (2016). Pengembangan Modul Pembelajaran Komunikasi Data Pada Mata Pelajaran Produktif 2 Kelas X Teknik Elektronika Industri Di Smk Negeri 2 Lamongan. *Jurnal Pendidikan Teknik Elektro*, 5(1).
- Riduwan, R. (2016). *Skala Pengukuran Variabel-variabel Penelitian*. Bandung: CV Alfabeta.
- Ristanto, R. H., Djamahar, R., Heryanti, E., & Ichsan, I. Z. (2020). Enhancing students' biology-critical thinking skill through CIRC-Based scientific approach (Cirsa). *Universal Journal of Educational Research*, 8(4A), 1-8. <https://doi.org/10.13189/ujer.2020.081801>
- Rusman, R. (2015). *Pembelajaran tematik terpadu*. Jakarta: Raja Grafindo Persada.
- Poulou, M. (2007). Personal teaching efficacy and its sources: Student teachers' perceptions. *Educational Psychology*, 27(2), 191-218. <https://doi.org/10.1080/01443410601066693>
- Sani, R. A. (2015). *Scientific Learning for Curriculum Implementation 2013*. Jakarta: Earth Literacy.
- Syaiful, S., Kamid, K., Kurniawan, D. A., & Pratama, W. A. (2021). Problem-based learning model on mathematical analytical thinking ability and science process skills. *Al-Jabar: Jurnal Pendidikan Matematika*, 12(2), 385-398. <https://doi.org/10.24042/ajpm.v12i2.9744>
- Winarni, E. W., & Purwandari, E. P. (2020). Project-based learning to improve scientific literacy for primary education postgraduate students in science subject. *Jurnal Prima Edukasia*, 8(1), 67-77. <https://doi.org/10.21831/jpe.v8i1.30618>
- Windschitl, M. (2004). Folk theories of "inquiry:" How preservice teachers reproduce the discourse and practices of an atheoretical scientific method. *Journal of Research in Science Teaching: The Official Journal of the National Association for Research in Science Teaching*, 41(5), 481-512. <https://doi.org/10.1002/tea.20010>



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