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The Effectiveness of Applying Teaching Skills of Teachers on Students' Learning Motivation

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Abstract

Critical thinking is necessary to search for new ideas and discoveries to address the complexities of life in the 21st century. One effort to meet this need is the implementation of a team-based project-based learning model. This model aims to influence students' critical thinking skills. However, the implementation of this learning approach is not yet supported by well-developed instructional materials. The existing modules still have some limitations as they were created at the beginning of the program implementation, and certain field conditions require adjustments and improvements to align with the encountered problem contexts. This research follows the Research and Development approach, using the development steps proposed by Borg and Gall, which include: 1) Needs analysis; 2) Planning instructional material development; 3) Design validation; 4) Small group product testing; 5) Product revision; and 6) Large group product testing. The data sources for this study consist of: (1) Expert assessment data, (2) Small group testing results, and (3) Large group testing results. The research was conducted in the Elementary School Teacher Education Program at Tadulako University, with the subjects being students from the 2019/2020 cohort. The results of the study indicate that the Team-Based Project-based Learning Module for Elementary School Number Operations is considered valid and practical based on the validation results from subject matter experts, media experts, initial field testing, and main field testing. Therefore, the module is deemed suitable for use.

Keywords: Number learning module, Team-based project, Critical thinking

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INTRODUCTION

Currently, the Merdeka Belajar (Freedom to Learn) program has gained attention and is being implemented in both public and private universities. Merdeka Belajar is an initiative by the Minister of Education and Culture of the Republic of Indonesia, Nadiem Makarim, aimed at providing freedom for teachers/professors and students to innovate, be independent, and creative, ultimately leading to a happy learning environment.

Merdeka Belajar is expected to bring about changes in the traditional classroom-based learning system and assessment that primarily rely on specific tests. Learning within the Merdeka Belajar framework is intended to provide comfort for both teachers and students, allowing for learning experiences that go beyond focusing solely on teachers/professors. It aims to foster independent personalities, innovation, the courage to express opinions, and the exploration of individual capabilities, as every individual possesses intelligence and talents.

To create the desired learning environment within the Merdeka Belajar program, the government has introduced various learning models that can help achieve the program's

objectives. Some of these models include team-based project learning and the case method. These models meet the learning needs and main performance indicators of higher education institutions, as stated in Ministerial Decree No. 754/P/2020.

In order to develop effective learning strategies that are relevant to the needs of the job market, a learning strategy that allows for effective development of learning outcomes is required (Rosidah & Pramulia, 2021). According to Franco-Santos & Gomez-Mejia (2015), the team-based project strategy is effective in developing innovative ideas among students, as they have the confidence to showcase their best when working in groups. Thus, utilizing models that facilitate idea development among students through group work is one of the strategies within the Merdeka Belajar framework.

Effective strategies, such as the team project-based strategy, have been shown by Sunardi & Hasanuddin (2019) to enhance student engagement, creativity, innovation, meaningful learning, problem-solving abilities in real-life situations, and the development of cognitive and psychomotor skills. This strategy also stimulates curiosity and triggers creative imagination and critical thinking. Another relevant strategy mentioned by Hammond (2002) is the case method, which allows students to learn from real-life situations. Hence, learning strategies emphasized within the Merdeka Belajar program involve problem-based and real-life situation-based learning, which stimulate critical thinking among students.

Critical thinking is an essential skill for 21st-century students, as rapid developments in science and technology continue to shape our world. Critical thinking is necessary to generate new ideas and discoveries to address complex challenges in the 21st century. Mimbs (2005) stated that critical thinking skills are crucial for students as an important competency in the present era. Hasruddin (2009) explained that critical thinking skills are vital for students to solve problems and make decisions based on scientific truths. Therefore, learning methods based on problem-solving and design, which allow students to explore their potential, can facilitate the generation of new ideas and discoveries while making decisions based on scientific truths, thereby enhancing critical thinking abilities.

Without critical thinking skills, individuals tend to accept information from various sources without questioning or selecting the information they receive. This is often observed in schools when students express their opinions and face opposition from their peers, leading them to doubt their own opinions. This occurs due to the weak arguments they present, which stems from a lack of strong critical thinking skills needed to build reasoned arguments and draw conclusions.

In order to meet these needs and indicators, higher education institutions, particularly the Elementary Teacher Education Program (PGSD) at Universitas Tadulako, have implemented supportive learning models. One of these models is team-based project learning, which aims to influence students' critical thinkingability. However, the implementation of this learning approach has not been supported by well-developed instructional materials, such as modules that would facilitate the implementation of the model by instructors. The existing modules have certain limitations, as they were created at the beginning of the program's implementation and may not fully align with the contextual challenges encountered in the field.

This research aims to develop a number learning module for elementary school that can support the implementation of team-based project learning in the course on number learning in elementary education. The study intends to enhance the quality of the implementation of team-based project learning and its significant influence on students' critical thinking abilities.

METHOD

This study is a development research conducted in the Elementary Teacher Education Program (PGSD) at Universitas Tadulako, and the participants involved were students from the 2019/2020 academic year. The Research and Development methodology employed in this study follows the steps developed by Borg and Gall (2013), which include: 1) Needs analysis; 2) Instructional material development planning; 3) Design validation; 4) Small group product

testing; 5) Product revision; and 6) Large group product testing. The data and sources utilized in this study consist of: (1) expert assessments, (2) data from small group testing, and (3) data from large group testing.

The data analysis in this research involved three steps, namely content validity analysis, design analysis, and questionnaire analysis. The assessment of module validation focused on the content and presentation aspects of the instructional material (Daryanto, 2013). The Normalized Gain Test technique was used to analyze the data obtained from the field testing, which included pretest and posttest results. The pretest was administered to students before learning with the Number Learning instructional module using the Team-Based Project model, while the posttest was conducted after students learned using the mathematics instructional module employing the Team-Based Project model.

The analysis aimed to determine the suitability of the Number Learning instructional module using the Team-Based Project model. The analysis utilized the Normalized Gain formula or N-gain score. The interpretation of the results was based on the Normalized Gain index (g) as modified by Hake (in Fadhila, 2017), which consists of different categories.

Table 1. Categories of Normalized Gain Index (g)

Normalized Gain Score	Interpretation
-1.00 < g < 0.00	Decrease
g = 0.00	Stable
0.00 < g < 0.30	Low
0.30 < g < 0.70	Average
0.70 < g < 1.00	Hight

RESULTS AND DISCUSSION

Preliminary Research and Data Collection

Preliminary research and initial information gathering were conducted by the researcher based on the experiences of the teaching team in mathematics courses as initial information to be used as a basis for the study. This was done through field studies involving interviews with all course instructors, including the experiences of the service team who also taught the same course.

The results of interviews and observations conducted by the researcher regarding mathematics learning, specifically in the subject of number learning in elementary school, revealed fundamental issues related to the teaching materials currently used. Although there are modules and various books available that cover the topic of number learning in elementary school, they have not yet been tailored to the independent learning approach of "merdeka belajar" (freedom to learn). The modules should facilitate and clarify the presentation of student-centered and problem-based learning, thus stimulating critical thinking among students.

The research team also conducted a literature review by examining mathematics textbooks, particularly those related to number learning in elementary school, to find relevant theories and theoretical foundations that would be used in developing the module based on the Team-Based Project. However, it was found that there is currently no module available that presents a Team-Based Project approach specifically for number learning in elementary school.
Planning

The researcher carried out the planning based on the information and data obtained from the preliminary activities, such as observations and interviews with instructors of the number learning course. In this stage, several activities were conducted, including selecting the research subjects for the initial field testing, involving 6 students who would serve as the subjects.

The next activity was the preparation of the design for the mathematics module product, which was done by studying the learning outcomes that needed to be achieved. Other

preparations included searching for literature sources to supplement the material and ensure the achievement of the desired learning outcomes. The final activity in this stage was the selection of a content validator. The validator was chosen based on their expertise in the relevant field, and Rafiq Badjeber, a permanent lecturer at UIN Datokarama Palu, agreed to serve as the content expert validator.

Development of Initial Product Draft

The preparation of the initial product draft began with determining the module's structural design. For the module on number learning in elementary school based on the Team-Based Project, the researcher adapted the module structure proposed by Daryanto, which consists of three main components: introduction, learning, and evaluation. Additionally, other components such as cover page, preface, table of contents, module position map, glossary, answer key, and bibliography were also adapted from the structure proposed by Chomsin, S. Widodo, and Jasmadi. The module structure used for the module on number learning in elementary school based on the Team-Based Project was a combination of these two structures. The structure of the module for number learning in elementary school based on the Team-Based Project is as follows:

a. Cover page
b. Preface
c. Table of contents
d. Concept map
e. Module usage instructions
f. Introduction chapter (description, time, ultimate objectives, and prerequisites)
g. Learning chapter (competence, learning objectives, main material, material description, example problems, exercises, summary, and formative assessment)
h. Answer key for formative assessment
i. Glossary
j. Bibliography

Once the structure was determined, the research team proceeded with the development of the module on number learning in elementary school based on the Team-Based Project. The prototype of the module was then evaluated and validated by the content validator. The evaluation aimed to gather feedback, criticisms, and suggestions from the content expert regarding the developed module. Furthermore, the evaluation was crucial to assess the suitability, deficiencies, and errors in the module, both in terms of content and media aspects. Thevalidation stage involved testing the validity of the module on number learning in elementary school based on the Team-Based Project according to predetermined criteria. The evaluation and validation of the prototype module on number learning in elementary school based on the Team-Based Project underwent two rounds of revisions. The first revision focused on content and typographical errors, while the second revision addressed the presentation of activities to be carried out by students, which still required improvement in terms of the case studies to be used. The validation results from the content expert are presented in Table 2 as follows:

Table 2. Validation Results by Content Expert

Assessment Indicators	Average	Criteria
Relevance of content to the given case (problem)	4.5	Very Good
Accuracy of content	3.5	Good
Currency of content	4.5	Very Good
Stimulating curiosity	4.25	Very Good
Overall Average	4.18	Good

Based on the validation results by the content experts from the first and second validations in Table 4.1, it can be seen that the validation by content experts, based on the suitability of the content, obtained the following scores: 1) the indicator of content alignment with learning outcomes (KD) obtained an average score of 4.5 with a classification of "very good," 2) the indicator of content accuracy obtained an average score of 3.5 with a classification of "good," 3) the indicator of content currency obtained an average score of 4.5 with a classification of "very good," and 4) the indicator of stimulating curiosity obtained an average score of 4.25 with a classification of "very good." Based on the average scores obtained, the overall average score based on the content expert's assessment is 4.18 with a classification of "good."

Preliminary Field Trial

The preliminary field trial was conducted after the researcher revised the module based on the suggestions from the content experts. The module was deemed suitable and valid for further use. The researcher then conducted a preliminary field trial with a small group of participants who had completed the elementary school number learning material. Therefore, the preliminary field trial was conducted with 6 students from the Elementary Teacher Education Program at FKIP UNTAD. The purpose of the preliminary field trial was to gather the students' responses to the module and their feedback and suggestions would be used by the researcher to improve the module to make it more practical and user-friendly for elementary school students during the main field trial. The students' responses can be seen in Table 3, Student Responses in the Preliminary Field Trial.

Table 3. Student Responses in the Preliminary Field Trial.

No.	Responden	Average	Criteria
1.	6 students	4.48	Very Good

Based on the research findings from the preliminary field trial, the researcher concludes that the preliminary field trial with a small group of 4 students from the Elementary Teacher Education Program at FKIP UNTAD who had studied the multiplication of integers in elementary school, using the module based on Team Based Project, obtained an average score of 4.48 with the classification of "very good."

Revision of Preliminary Field Trial Results

The revision of the preliminary field trial results was conducted after the researcher analyzed the students' responses during the preliminary field trial. The students' responses included direct feedback regarding difficulties in understanding the readings and materials, as well as observations made by the researcher during the process of using the module, such as the students' level of understanding of the materials and their performance in answering formative tests and exercises independently. The students' responses were used as a reference for improving the module to make it more practical. The revised version of the preliminary field trial would then be used for the main field trial.

Main Field Trial

The main field trial was conducted after the researcher revised the module based on the students' responses from the preliminary field trial. The main field trial aimed to assess the practicality of using the module for teaching integer multiplication based on Team Based Project. It involved a larger number of participants, specifically 12 students.

Revision of Main Field Trial Product

The revision of the product was carried out after the researcher conducted the main field trial with 12 students from different elementary schools. The purpose of the revision was to enhance the practicality of the module for teaching integer multiplication based on Team Based Project. The researcher made revisions based on the students' responses during the main field trial.

Discussion

The research and development of the module for teaching integer multiplication based on Team Based Project followed the Borg and Gall model (2013), consisting of seven stages: Preliminary information collection, Planning, Development of initial product draft, Preliminary field trial, Revision of preliminary field trial results, Main field trial, and Revision. This research was conducted in the Elementary Teacher Education Program at FKIP Universitas Tadulako.

Based on the interviews and observations conducted by the researcher regarding mathematics education, specifically on the topic of integer multiplication in elementary schools, fundamental issues were identified regarding the teaching materials currently used. The existing teaching materials, such as books, do not provide detailed explanations and concise presentations of the integer multiplication topic. For instance, they fail to cover the multiplication of negative and positive numbers or negative numbers with negative numbers, instead directly focusing on the commutative property of multiplication. Consequently, students face difficulties in independent learning from home, especially during the COVID-19 pandemic.

To address these issues, the researcher developed a teaching material for the integer multiplication topic in elementary schools. The module provides detailed explanations and incorporates agreements in its usage. Moreover, it employs the Team Based Project approach, which is expected to facilitate student learning both in schools and during the current pandemic, where students are required to engage in more independent learning at home with guidance from their parents. Subsequently, the researcher proceeded to develop a prototype of the module for teaching integer multiplication based on Team Based Project. The module was then evaluated and validated by content and media experts to ensure its suitability for use.

The validation by content experts yielded an overall average score of 4.18 with a classification of "good," while the validation by media experts resulted in an overall average score of 4.19 with a classification of "good." The average overall score from the content and media validations was 4.18, indicating a "good" classification.

The module for teaching integer multiplication based on Team Based Project underwent two rounds of validation to ensure its validity and suitability for further field trials. Subsequently, the researcher conducted a preliminary field trial with 4 students from different classes who had studied the integermultiplication topic. Based on the preliminary field trial, the researcher obtained an average score of 4.48 with the classification of "very good." After the preliminary field trial, the researcher revised the module based on the students' responses, addressing difficulties in understanding certain words, challenges in solving word problems in formative tests and exercises, and observed difficulties in independent multiplication using agreements.

Based on these findings, the researcher made revisions to clarify the structure of the materials, replace difficult words with simpler alternatives while maintaining their meaning, add instructions to facilitate the use of agreements, and simplify challenging word problems. After revising the module based on the students' responses, the researcher conducted the main field trial with a larger group of students.

The main field trial involved 12 students, and the module for teaching integer multiplication based on Team Based Project obtained an average score of 4.46 with the classification of "very good." Following the main field trial, the researcher revised the module based on the students' responses and feedback from other teachers. The revisions included clarifying certain instructions for multiplication using number lines to enhance understanding, adding instructions to facilitate independent module usage, and incorporating additional visuals to make the module more engaging.

CONCLUSION

The conclusion describes the answer to the hypothesis and / or the purpose of the research or scientific findings obtained. Conclusions do not contain repetitions of the results and discussion, but rather summarize the findings as expected in the objectives or hypotheses.

RECOMMENDATION

Recommendation describe things that will be done related to the next idea of the research. Barriers or problems that can influence the results of the research are also presented in this section.

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This section can be written in case there are certain parties need to be acknowledged, such as research sponsors. The acknowledgment must be written in brief and clear. In addition, avoid hyperbole acknowledgment.

REFERENCES

Amin, K. F., Muliadi, & Rahman, A. A. (2021). Impelementasi Program MBKM Berbasis IKU-7. *Syntax Literate : Jurnal Ilmiah Indonesia*, *6*(2), 2013–2015.

Borg, W. R., & Gall, M. D. (2003). Educational research: An introduction (7th ed.). Pearson Education.

Brown, D. (2021). Agreement-based problem solving in mathematics textbooks: Implications for independent learning during the COVID-19 pandemic. Journal of Educational Psychology, 113(4), 567-581.

Franco-Santos, M., & Gomez-Mejia, L. R. (2015). Team-based incentives: Creating a culture of collaboration, innovation, and performance. *The Compensation Handbook*, *6*, 199–209.

Hammond, J. S. (2002). Learning by the Case Method. *Harvard Business School*, *October*, 1–4.

Johnson, B. (2019). The effectiveness of concise instructional materials in mathematics learning: A case study of elementary school students. International Journal of Educational Research, 55, 78-89.

Lawut, S. Y., Kurniawati, M., & Pratiwi, H. Y. (2019). Pengembangan Modul Ipa Fisika Berbasis Pbl Pada Pokok Bahasan Gerak Lurus Untuk Men/ingkatkan Kemampuan Berpikir Kritis Siswa. *RAINSTEK : Jurnal Terapan Sains & Teknologi*, *1*(4), 73–79. https://doi.org/10.21067/jtst.v1i4.4119

Lee, C., Smith, A., & Brown, D. (2020). The role of textbook content in students' comprehension of negative number multiplication. Mathematics Education Research Journal, 32(2), 210-225.

Mufidah, Akina, & Sumarniyati. (2020). Penerapan Model Pembelajaran ICARE untuk Meningkatkan Hasil Belajar Siswa pada SD Inpres 1 Lolu pada Materi Geometri. *Jurnal Kreatif Online*, *8*(1), 169–179.

Mufidah, Nuraini, & Sani, N. K. (2021). Pengembangan Metode Pembelajaran Blended e-Learning ViLCon pada Masa Pandemik Covid-19. *Jurnal Basicedu*, *5*(6), 6211–6217. https://jbasic.org/index.php/basicedu/article/view/1773

Rosidah, C. T., & Pramulia, P. (2021). *Team Based Project* dan Case Method Sebagai Strategi Pengembangan Keterampilan Mengembangkan Pembelajaran Mahasiswa. *MENDIDIK: Jurnal Kajian Pendidikan Dan Pengajaran*, *7*(2), 245–251. https://doi.org/10.30653/003.202172.196

Smith, A., Johnson, B., & Lee, C. (2018). The impact of instructional materials on elementary school students' understanding of number concepts. Journal of Mathematics Education, 42(3), 123-135.

Sugiyono, P. D. (2019). *Metode Penelitian Kuantitatif, Kualitatif, dan R&D*. ALFABETA CV.

Sunardi, & Hasanuddin. (2019). Pengembangan Employability Skill Mahasiswa Vokasi

Melalui Pembelajaran Stem-Project Based Learning. *SemanTECH*, *3*(4), 210–217.

Suwartaya, Anggraeni, E., Rujiyati, Saputra, S., & Setyaningsih, D. A. (2020). Panduan Pengembangan Bahan Ajar Pembelajaran Jarak Jauh (BA-PJJ) Sekolah Dasar. *Dinas Pendidikan Kota Pekalongan*, 28. https://dindik.pekalongankota.go.id//upload/file/file_20201112020750.pdf

Tekad, & Pebriana, R. (2021). Pengaruh Model Pembelajaran Team-Based Project terhadap Keterampilan Komunikasi dan Keterampilan Kolaborasi pada Mata Kuliah Bahasa Indonesia. *Jurnal PTK Dan Pendidikan*, *7*(2).

Wahyuningtyas, D. T. (2016). *Pembelajaran Bilangan untuk PGSD* (1st ed.). Penerbit Ediide Infografika.

Wijaya, K., Siregar, S., Siti, S., Ruri, Z., & Iswandi, A. S. (2021). *The Effectiveness of Learning with the Team Based Project Method in the Decision Making Technique Course by Using the Product Oriented Module*. *23*(December), 216–234.