ISSN xxxx-xxxx (print) | xxxx-xxxx (online)

Journal of Innovation, Character and Excellent Elementary Education (JICE3)
Volume 01 No 01 Halaman 11-19

IMPROVING STUDENTS' ACTIVITY AND MATHEMATICAL LITERACY ON THE VOLUME OF CUBODITS USING A COMBINATION OF GROUP INVESTIGATION AND TALKING STICK MODELS BASED ON TPACK

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Submitted
June-05-2025

Revised
June-06-2025

Accepted
June-06-2025

Published
June-10-2025

Kata Kunci:
Literasi;
Tongkat Bicara;
TPACK.

Keyword:
Literacy;
Talking Stick;
TPACK.

Abstrak

Permasalahan dalam penelitian ini adalah rendahnya literasi matematika siswa pada materi volume balok. Hal ini disebabkan oleh pembelajaran belum merangsang siswa untuk aktif dalam pembelajaran, dan siswa belum memahami konsep balok hingga pengaplikasian rumus volume balok dalam menyelesaikan masalah. Tujuan penelitian ini adalah untuk mengetahui aktivitas siswa dalam proses pembelajaran dan literasi matematika siswa pada materi volume balok melalui penggunaan model pembelajaran Group Investigation dan Talking Stick berbasis TPACK. Penelitian ini menggunakan jenis penelitian Clasroom Action Research yang dilaksanakan dalam dua siklus dengan dua kali pertemuan. Sampel dalam penelitian ini adalah siswa kelas V dengan 10 siswa yang terdiri dari 7 siswa Perempuan dan 3 laki-laki. Teknik analisis data yang digunakan adalah kualitatif dan kuantitatif. Instrumen yang digunakan adalah observasi dan tes. Hasil penelitian ini menunjukkan peningkatan aktivitas siswa pada siklus I mencapai kriteria sebagian kecil siswa aktif meningkat pada siklus II mencapai kiteria seluruh siswa sangat aktif dan literasi matematika siswa memperoleh ketuntasan klasikal pada siklus satu mencapai 50% dengan kategori literasi matematika rendah meningkat pada siklus II mencapai 90% dengan kategori literasi matematika sangat tinggi. Hasil Penelitian ini diharapkan dapat dijadikan sebagai inovasi pembelajaran di sekolah dasar dalam upaya peningkatan literasi matematika siswa.

Abstract

The problem in this study is the low mathematical literacy of students in the material of cuboid volume. This is caused by learning that has not stimulated students to be active in learning, and students have not understood the concept of cuboids to the application of cuboid volume formulas in solving problems. The purpose of this study was to determine student activity in the learning process and students' mathematical literacy in the material of cuboid volume through the use of the Group Investigation and Talking Stick learning models based on TPACK. This study uses the type of Classroom Action Research research which is carried out in two cycles with two meetings. The sample in this study was grade V students with 10 students consisting of 7 female students and 3 male students. The data analysis techniques used are qualitative and quantitative. The instruments used are observation and tests. The results of this study show an increase in student activity in cycle I reaching the criteria of a small number of active students increasing in cycle II reaching the criteria of all students being very active and students' mathematical literacy obtaining classical completeness in cycle one reaching 50% with the category of low mathematical literacy increasing in cycle II reaching 90% with the category of very high mathematical literacy. The results of this study are expected to be used as an innovation in learning in elementary schools in an effort to improve students' mathematical literacy.

ISSN xxx-xxx (print) | xxxx-xxxx (online)

Journal of Innovation, Character and Excellent Elementary Education (JICE3)
Vol. 01 No. 01 pp. 11-19

Citation :
Prastitasari, Y., & Prihandoko, Y. (2025). Improving students' activity and mathematical literacy on the volume of cubodits using a combination of group investigation and talking stick models based on tpack. *Journal of Innovation, Character and Excellent Elementary Education, 01* (01), 11-19.

INTRODUCTION

Mathematical literacy is a comprehensive and complete mathematical ability in the form of the ability to formulate, interpret mathematics and relate mathematics in everyday life (OECD, 2017; Sakerani et al., 2022; Sakerani et al., 2023). Mathematical literacy is in the spotlight of the world, especially Indonesia. This is because mathematical literacy skills have a broad influence on a person's knowledge and performance both in everyday life and in the world of work (Prastitasari, 2018; Purnaningtyas & Safa'atullah, 2023).

The influence of mathematical literacy is so extraordinary that the world's student mathematical literacy monitoring institutions, namely TIMSS and PISA, conduct evaluations of approximately 79 participating countries every 5 years. The questions presented are in the form of contextual problem solving because mathematics is always closely related to aspects of daily life, for example the application of the concept of cuboids such as milk cartons, bathtubs, aquariums, and so on (Prastitasari et al., 2021). Therefore, mathematical literacy needs to continue to be echoed by the government from kindergarten to college (Hewi & Shaleh, 2020; (Prastitasari, Prastitasari, Jumadi, et al., 2022).

Now the focus is on the results of Indonesian students' mathematical literacy? Is it satisfactory or unsatisfactory? Based on the results of PISA in 2018, Indonesian students' mathematical literacy was ranked 74th out of 79 participating countries, while the results of TIMSS in 2015, Indonesian students' mathematical literacy was ranked 44th out of 49 participating countries (Prastitasari et al., 2018; OECD, 2019; Amaliya & Fathurohman, 2022). These results indicate that students' mathematical literacy is unsatisfactory. The findings in the field are not much different from this fact. The pretest results showed that 60% of students out of 10 students' mathematical literacy was still relatively low. Furthermore, the results of observations showed that students' mathematical literacy had not reached the KKM set by the school, which was ≥ 70. In addition, based on the results of interviews and observations during learning, it showed that students were not active in learning.

The low level of students' mathematical literacy is caused by several factors, including 1) students are rarely actively involved in the learning process, 2) lack of mastery of the concept of cuboid space and cuboid volume, 3) technology-based learning media have not been used to arouse children's interest in learning, and 4) have not used varied and innovative learning models to increase student participation in classroom learning (Mansur et al., 2021).

Based on the problems and causes above, it needs to be followed up. Efforts that can be made are by using innovative learning models and media (Prastitasari et al., 2022). Many studies have been conducted by previous researchers in an effort to improve mathematical literacy by using the right model in learning. In addition to the use of models, it is necessary to be accompanied by the use of technology-based media during learning. The model that can be a highlight for improving students' mathematical literacy is the use of a combination of the Group Investigation and Talking Stick models based on TPACK.

The main model used in learning is Group Investigation. The Group Investigation model is a model that stimulates students to be active in discussions because there are group activities to solve

ISSN xxxx-xxxx (print) | xxxx-xxxx (online)
Journal of Innovation, Character and Excellent Elementary Education (JICE3)
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a project given by the teacher until students are able to present their findings in front of the class. Through the implementation of Group Investigation, it can increase student activeness in learning and stimulate students' critical thinking skills so that students are able to solve mathematical problems in everyday life (Devi, Wibawa, & Sudiandika., 2021; Yunianto, 2022).

The second model of this study is Talking Stick. As is known, this model uses music and sticks as playing tools. This model encourages students to dare to express their opinions when they get the stick when it is rolled using music. This use makes students actively involved in learning, makes students focus on learning and forges students' memory (Hernawati, 2019; Nurhalimah et al., 2022).

The approach used is TPACK. TPACK is an approach used by teachers that relates to content, pedagogy, and technology and is then applied so that the learning process achieves maximum results (Najwa & Indrianto, 2023;). Through TPACK, learning becomes effective and interesting using technology in learning with the hope of building students' mathematical literacy in an interesting way and student involvement in learning becomes more active.

Based on the description above, the purpose of this study is to explain the increase in student activity in learning and the improvement of students' mathematical literacy through the Group Investigation and Talking Stick models based on TPACK in grade V students of SDN 1 Anjr Seraoat Timur 1 Central Kalimantan.

METHOD

This study uses the Classroom Action Research type of research. This study focuses on solving problems in the classroom found during learning (Prastitasari, 2023). The research was carried out in two cycles. With stages in the form of planning, implementing actions based on the design, observations made by observers in accordance with the instruments that have been made, and reflections based on the results of the research that has been carried out. The approaches used in this study are quantitative and qualitative. The quantitative approach uses scores/or numbers while the qualitative approach uses descriptions based on the results found.

This research was conducted at SDN 1 Anjr Seraoat Timur 1 Central Kalimantan, grade V students consisting of 10 students (7 female students and 3 male students) on the material of cuboid volume by implementing a combination of Group Investigation and Talking Stick models based on TPACK.

The steps for combining the Group Investigation and Talking Stick models based on TPACK are (1) explaining the learning objectives, tools and materials that will be used in the learning process, about the Volume of cuboids using PPT (Group Investigation, Talking Stick, TPACK), (2) dividing students into several small groups consisting of 3-4 people (Group Investigation), (3) planning learning tasks together with their group members (Group Investigation), (4) guiding students to investigate group tasks (Group Investigation), (5) preparing reports as presentation materials using PPT (Group Investigation and TPACK), (6) conducting Talking Stick games and presentations using PPT (Group Investigation and Talking Stick), and (7) the teacher guiding students to provide responses to their friends' discussion reports (Group Investigation and Talking Stick).

The factors of this research are student activities and students' mathematical literacy. The type of data used is quantitative data obtained from students' learning outcomes (mathematical literacy) and qualitative data obtained from students' activity results. Indicators of success of the research

This is based on the factors studied, namely (a) student activity is said to have increased if

ISSN xxx-xxx (print) | xxxx-xxxx (online)

Journal of Innovation, Character and Excellent Elementary Education (JICE3)
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student activities are measured using observation techniques during the learning process teaching achieves a score of ≥ 20 with a very active category and classical student completion categorized as almost all students are very active reaching ≥ 80%, and (b) students' mathematical literacy is said to have increased if students in learning activities meet individual completeness reaching ≥ 70% with high mathematical literacy criteria while classical completeness reaches ≥ 70% of students' scores get high mathematical literacy criteria scores.

RESULTS AND DISCUSSION

Student Activities

Learning is carried out in two cycles. Student activity continues to increase in each cycle. Activity in cycle one obtained a classical percentage of 50% with the criteria "some small active students" and in the cycle the two classical percentages obtained are 100% with the criteria "all students very active" and able to achieve the set success indicators, namely ≥ 80%. as shown in Figure 1.

Figure 1. Results of Observations of Student Activities in Cycles 1 and 2

Aspects observed in activities Students consist of seven aspects, namely (1) student activities listening to explanations of learning objectives, what tools and materials will be used in the learning process, about the volume of cuboids using PPT (***Group investigation, Talking Stick, TPACK***), (2) student activities sitting in groups according to division (***Group investigation)***, (3) student activities carrying out learning tasks together with their group members (***Group investigation***), (4) student activities carrying out group task investigations (***Group Investigation***), (5) student activities preparing reports as presentation materials using PPT (***Group Investigation* and TPACK**), (6) student activities playing games*Talking Stick*and presentation using PPT (***Group investigation* And *Talking Stick***), and (7) student activities providing responses to their friends' discussion reports.***Group investigation* And *Talking Stick***).

In each aspect observed, the score continues to increase in each cycle. Through the use of a combination of models*Group Investigation* And *Talking Stick*TPACK-based learning can increase student activity in learning activities. This can happen because teachers reflect on the research conducted, make improvements and implement these improvements. Thus, it is necessary to carry out reflection activities in implementing learning so that it will have an impact on increasing student

ISSN xxxx-xxxx (print) | xxxx-xxxx (online)
Journal of Innovation, Character and Excellent Elementary Education (JICE3)
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activity in the classroom and students' mathematical literacy (Afriani & Prastitasari, 2023; Wati & Prastitasari, 2023).

Student activity is demonstrated by student participation in all learning activities, including:**First**, discuss with their group members. During discussion activities, students can learn with their group members. Through group learning, students can help each other so that peer tutoring occurs (Prastitasari, Prastitasari, Isnani, et al., 2022; Prastitasari et al., 2023).**Second**, completing assignments. During assignment completion, students need to be continuously monitored and guided through well-directed discussions.

Third, preparing reports using PPT. During the activity of preparing reports using PPT, students will learn to write reports using technology. Through the use of technology, it can provide an attraction in making interesting reports using designs and generate enthusiasm in learning. In addition, it can make it easier for students to understand the material, enthusiasm in learning, and increase student attention in learning (Hatimah & Prastitasari, 2023; Manongga, 2021).

Fourth, able to present work results in front of the class and provide feedback to the presentation group. The activity of presenting work results and providing feedback can foster student activity because in its implementation, students who are appointed practice good communication in front of the class. Communication is a skill in conveying the results of one's findings to others either verbally, in writing, or through modeling (Nurlailasari et al., 2018). Through this skill, it can increase student confidence, good communication skills in front of the class, and student activity in the class.

Mathematical Literacy

Learning is carried out in two cycles. Mathematical literacy continues to increase in each cycle. Mathematical literacy in the first cycle obtained a classical percentage of 50% with the criteria of "low mathematical literacy" and there were 50% with the criteria of "high mathematical literacy". Furthermore, in the second cycle, the classical percentage obtained increased to 90% with the criteria of "very high mathematical literacy" and was able to achieve the set success indicator of ≥ 70% as shown in Figure 2.

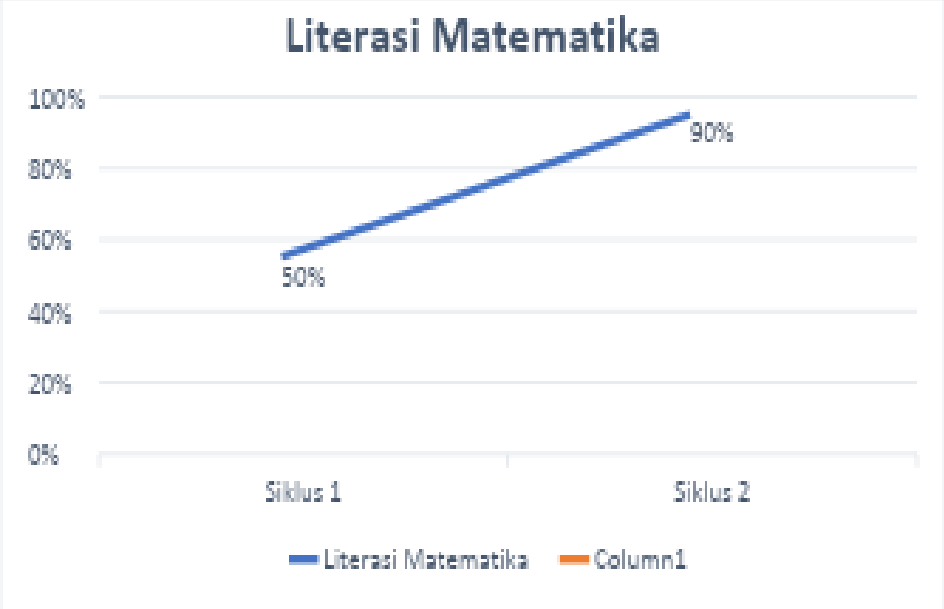

Figure 2. Results of Mathematical Literacy Cycles 1 and 2

ISSN xxx-xxx (print) | xxxx-xxxx (online)
Journal of Innovation, Character and Excellent Elementary Education (JICE3)
Vol. 01 No. 01 pp. 11-19

Improving mathematical literacy cannot be separated from the role of teachers in learning activities. Teachers always evaluate and reflect to improve the quality of learning so that mathematical literacy continues to increase. In learning, teachers carry out the learning process based on planning made starting from the initial, core and final activities with the aim of effective and efficient learning. The teacher will convey the learning objectives that are being studied. According to (Putrianingsih et al., 2021) conveying learning objectives is very important because the objectives are the final achievement results that students must obtain.

The increase in mathematical literacy is caused by discussion-based learning. Students learn from each other and exchange information based on what they have mastered. Education as a process learning should pay attention to potential students or other learning subjects so that students can develop optimally (Mujib & Suyadi, 2020). Through discussion students can make it easier for students to achieve their goals which are desired.

In addition, the increase in mathematical literacy is also caused by learning by linking TPACK. Teachers integrate content and technology according to the components contained in TPACK. TPACK (*Technological Pedagogical and Content Knowledge*) is a framework for understanding and describing the information needed by teachers, pedagogical practices and understanding concepts through the integration of technology into the learning environment (Widaningsih et al., 2023). Students are more motivated in the learning process, solving problems and presenting discussion results using technology.

To see the results of students' mathematical literacy, an evaluation is needed. Evaluation is an activity carried out by teachers in the learning process to obtain information about the extent to which students have mastered the material being studied. Have they achieved the designed learning objectives or have they not achieved the expected learning objectives. Based on this understanding, learning evaluation is a component that must be present in learning, both in core activities and final learning activities (Prihandoko et al., 2023). Good learning evaluation is designed according to students' daily lives (contextual). Through contextual-based evaluation, students are able to get an overview and strategies for solving problems in their lives (Prastitasari, 2019).

CONCLUSION AND RECOMMENDATION

The results of this study show that by using a combination of the Group Investigation and Talking Stick models based on TPACK on the material on the volume of cuboids, it is possible

implemented well in accordance with the learning steps so as to increase students' mathematical activity and literacy. In student activity, there has been an increase from the criteria of a small number of active students to all students being very active, while students' mathematical literacy has been able to achieve the minimum completeness set, namely individual students achieving a score of ≥ 70 and in terms of classical percentage achieving 90% with very high mathematical literacy criteria. Based on the percentage obtained, it can be stated that the use of a combination of the Group Investigation and Talking Stick models based on TPACK can increase students' mathematical activity and literacy.

Based on the conclusions that have been described above, this study can be used in selecting and determining innovative learning models as an effort to improve students' mathematical literacy. This study is also expected to be further developed through further research to improve the quality of learning in the classroom and have an impact on improving students' mathematical literacy in

Indonesia.

References

Afriani, D., & Prastitasari, H. (2023). Improving Student Activities and Learning Outcomes in Mathematics Content Using the BEST Model in Class IV of SDN Antasan Besar 1 Banjarmasin.*Journal of Social Education and Counseling*, *1*(3), 570-581.

Amaliya, I., & Fathurohman, I. (2022). Analysis of Mathematical Literacy Skills Reviewed from Elementary School Students' Learning Styles.*Journal of Elementary Education Research*, *5*(1), 45–56. https://doi.org/https://doi.org/10.26618/jrpd.v5i1.7294

Devi, K. S. T., Wibawa, I. M. C., & Sudiandika, I. K. A. (2021). Application of Group Investigation Learning Model to Improve Mathematics Learning Outcomes of Grade V Students.*Pulpit of Knowledge*, *26*(2), 233–242. https://doi.org/10.23887/mi.v26i2.36079

Hatimah, H., & Prastitasari, H. (2023). Improving Student Activities and Learning Outcomes in Science Content Using the GREAT Model.*Journal of Social Education and Counseling*, *1*(3), 694-708.

Hernawati, A. R. (2019). USING TALKING STICK MODEL TO IMPROVE STUDENTS' LEARNING OUTCOMES IN READING ARTICLES.*Journal of Educational Vehicles*, *6*(2), 93. https://doi.org/10.25157/WA.V6I2.3049

Hewi, L., & Shaleh, M. (2020). Reflection on PISA (The Programme for International Student Assessment) Results: Improvement Efforts Focus on Early Childhood Education.*Golden Age Journal*, *4*(01), 30–41. https://doi.org/10.29408/jga.v4i01.2018

Manongga, A. (2021). The importance of information technology in supporting the teaching and learning process in elementary schools.*Postgraduate Program of Gorontalo State University Proceedings of the National Seminar on Elementary Education*, *978-623–98*(November), 1–7.

Mansur, H. (2021). The problem of distance learning during the COVID-19 pandemic.

Mujib, Z., & Suyadi, S. (2020). Theory Humanistic and Implications in Islamic Religious Education Learning in Science High School Yogyakarta Quran.*Journal Islamic Education*, *4*(1), 11–23. Retrieved from https://www.journal.unipdu.ac.id/index .php/jpi/article/view/2116

Najwa, I., & Indrianto, N. (2023). Technological Pedagogical Content Knowledge (TPACK) of Teachers in Thematic Learning of Class V at State Elementary School 3 Jembrana.*MADROSATUNA: Journal of Elementary Madrasah Teacher Education*, *5*(2), 83-92. https://doi.org/10.47971/mjpgmi.v5i2.519

Nurhalimah, I. H., Nuraida, I., & Rachmawati, T. K. (2022). Talking Stick Method in Mathematics Learning.*Mount Djati Conference Series*, *12*, 34–38.

Nurlailasari, R., Enawaty, E., & Lestari, I. (2018). Efforts to Improve Students' Communication Skills Through the Think-Talk-Write Learning Model.*Journal of Education and Learning*. https://jurnal.untan.ac.id/index.php/jpdpb/article/view/23851%0Ahttps://jurnal.unt

an.ac.id/index.php/jpdpb/article/viewFile/23851/18706

OECD (2017), *2013 OECD Recommendation of the Council on Gender Equality in Education, Employment and Entrepreneurship*, OECD Publishing, Paris, https://doi.org/10.1787/9789264279391-en.

OECD. (2019). Education in Indonesia learning from the results of PISA 2018.*Education Assessment Center, Research and Development, Ministry of Education and Culture*, *021*, 1–206. http://repositori.kemdikbud.go.id/id/eprint/16742

Prastitasari, H., Qohar, A., & Sa'dijah, C. (2018). Development of teaching materials based on a contextual approach to flat geometry material for grade IV students.*Journal of Education: Theory, Research, and Development*, *3*(12), 1599-1605.

Prastitasari, H. (2018).*Development of teaching materials based on a contextual approach based on river environment on flat building material for grade IV elementary school students*(Doctoral dissertation, State University of Malang).

Prastitasari, H. (2019). Mathematics Learning Based on Contextual Approach.-, *5*(1), 83-88.

Prastitasari, H., Sa'dijah, C., & Aji, S. M. W. (2021). Diagnosis of Arithmetic Difficulties in Lower Grade Children.*E-CHIEF Journal*, *1*(2), 9-17.

Prastitasari, H., Prastitasari, H., Isnani, N. M., Jumadi, J., Sari, D. D., & Wardhani, I. S. K. (2022). STUDENTS' INTEREST IN LEARNING MATHEMATICS DURING THE COVID-19 PANDEMIC, REVIEWED FROM A GENDER PERSPECTIVE.*Primary: Journal of Elementary School Teacher Education*, *11*(3), 849-861.

Prastitasari, H., Prastitasari, H., Jumadi, J., Marhamah, E., Purwanti, R., & Sari, R. (2022). The Use of Pairing Models to Improve Motivation, Activity, and Mathematics Learning Outcomes of Elementary School Students in Geometry Material.*Primary: Journal of Elementary School Teacher Education*, *11*(1), 276-288.

Prastitasari, H., Fitria, M., Jumadi, J., Sunarno, S., Annisa, M., & Prihandoko, Y. (2022). Improving elementary school students' mathematics achievement by using a combination of PBL, SR, and QOD learning models.*Primary: Journal of Elementary School Teacher Education*, *11*(6), 1792-1804

Prastitasari, H., Isnani, N. M., Jumadi, J., Purwanti, R., & Huljannah, M. (2023). IMPROVING ACTIVITY, INTEREST, AND LEARNING OUTCOMES OF MATHEMATICS USING THE MAP TURRET MODEL.*ELSE (Elementary School Education Journal): Journal of Elementary School Education and Learning*, *7*(1).

Prihandoko, Y., Prastitasari, H., Kurahmah, T., Fendrik, M., & Istianah, T. N. (2023). Implementation of the PREMIER model based on river area to improve fourth-grade students' mathematical problem-solving ability. *Journal Of Teaching And Learning In Elementary Education*, *6*(1), 27-38.

Purnaningtyas, Y., & Safa'atullah, M. (2023). Students' Mathematical Literacy Ability in Terms of Self Efficacy Through Problem Based Learning with PMRI Approach.

Unnes Journal of Mathematics Education, *12*(1), 34-41. https://doi.org/10.15294/ujme.v12i1.67553

Putrianingsih, S., Muchasan, A., & Syarif, M. (2021). The Role of Learning Planning on Teaching Quality.*Innovative*, *7*(1), 206–231.

Sakerani, S., Prastitasari, H., & Purwanti, R. (2022). Development of Wetland-Based Teaching Materials to Improve English Vocabulary, Reading Literacy Skills, Early Childhood Numeracy and Elementary School. *International Journal of Social Science and Human Research*, *5*(9).

Sakerani, S., Prastitasari, H., & Fadillah, M. H. (2023). Development of Wetland-Based Pop-Up Book to Improve English Vocabulary and Numeracy Literacy Skill in Kindergarten. *International Journal of Social Science And Human Research*, *06*(09), 5772–5778. https://doi.org/10.47191/ijsshr/v6-i9-56

Wati, M., & Prastitasari, H. (2023). Improving Mathematics Learning Activities and Outcomes on Angle Measurement Material Using Prism Models in Elementary School Students.*Journal of Social Education and Counseling*, *1*(3), 495-504.

Yunianto, S. (2022). APPLICATION OF GROUP INVESTIGATION LEARNING MODEL IN IMPROVING STUDENTS' MATHEMATICS LEARNING OUTCOMES IN GRADE XI OF SMA NEGERI 1 SIDAREJA.*LEARNING: Journal of Innovation in Educational Research and Learning*, *2*(3), 257-267. https://doi.org/10.51878/learning.v2i3.1582.