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The Effect of Problem-Based Learning Model with Sasak Local Wisdom on Students' Cognitive Abilities

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Abstract

This study investigates the effect of Problem-Based Learning (PBL) integrated with Sasak local wisdom on high school students' cognitive abilities, particularly in understanding electrolytes and non-electrolytes. PBL, an active learning approach, encourages students to solve real-world problems, fostering critical thinking and problem-solving skills. When combined with local cultural knowledge, such as the Sasak people's practices, PBL enhances academic learning and strengthens students' cultural identity. The research involved two groups of Grade X students from SMA Islam Al-Azhar NW Kayangan, North Lombok. The experimental group ($n = 30$) received PBL instruction incorporating Sasak cultural contexts, while the control group ($n = 31$) followed conventional instruction. Data were collected through pretest-posttest assessments and analyzed using paired and independent sample t-tests. The findings reveal that the experimental group demonstrated significantly higher cognitive gains than the control group. The experimental group had a mean gain score of 28.70 ($t = -28.70$, $p < 0.001$), compared to 11.95 ($t = -11.95$, $p < 0.001$) for the control group. Students in the experimental group showed improved understanding of scientific concepts, such as conductivity and ionization, through real-life applications related to Sasak culture, like local water sources and traditional purification methods. The results highlight the effectiveness of integrating local wisdom into PBL, improving both students' academic performance and their connection to cultural heritage. The study suggests that PBL with local wisdom is a promising pedagogical approach, enhancing cognitive abilities and providing a more meaningful, culturally relevant learning experience.

Keywords: Cognitive Development; Electrolytes; Problem-Based Learning; Sasak Local Wisdom

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INTRODUCTION

In recent years, the integration of Problem Based Learning (PBL) with local wisdom has emerged as an innovative and effective teaching strategy that not only enhances academic achievement but also strengthens students' cultural identity. PBL is an active learning approach that challenges students to engage in real-world problems, requiring them to apply their knowledge, think critically, and develop problem-solving skills. By incorporating local wisdom, PBL becomes a tool to connect academic content with students' lived experiences, fostering a deeper and more meaningful understanding of the subject matter.

The application of PBL in education has proven to be particularly impactful in improving students' cognitive abilities. This approach shifts the focus from passive learning to active engagement, where students are not just recipients of information but active participants in the learning process. Research has consistently shown that PBL enhances critical thinking, creativity, and analytical skills, as students work together to solve complex, context-based problems (Bahri, 2022; Murat, 2022; Zulyusri et al., 2022). Furthermore, studies indicate that when PBL is integrated with local wisdom, such as the cultural values and practices of the Sasak people, it provides a contextually rich and relevant learning environment. This approach helps bridge the gap between abstract academic knowledge and the students' daily lives, making learning both meaningful and applicable to their cultural experiences (Puspita et al., 2024; Simamora et al., 2022).

The integration of local wisdom in education is particularly important in regions with rich cultural heritage, such as the Sasak culture in Lombok. The Sasak people have a deep connection with their natural environment, and their traditional knowledge, including sustainable farming practices, water purification methods, and the use of local herbs, provides valuable learning material. By incorporating these cultural elements into the PBL model, students are not only able to see the relevance of what they are learning to their daily lives but also gain a sense of pride in their cultural identity. This alignment between academic content and local culture has been shown to significantly increase student motivation and engagement, as students can relate the material to their own experiences (Puspita et al., 2024; Simamora et al., 2022).

Moreover, the PBL model, when combined with local wisdom, offers an opportunity to foster character development alongside cognitive growth. Research has shown that PBL encourages not only academic skills but also the development of critical life skills, such as collaboration, communication, and decision-making. In addition, it enhances students' social awareness and cultural competence, as they engage with issues and solutions relevant to their own communities (Sembiring et al., 2025; Sugiarni et al., 2022). The integration of local knowledge encourages students to reflect on their cultural values and practices, which in turn fosters a deeper understanding of their identity and role in society.

In the context of science education, particularly in subjects like chemistry, the integration of local wisdom can help students connect abstract scientific concepts with real-world phenomena. For example, understanding the properties of electrolytes and non-electrolytes can be made more meaningful when linked to everyday experiences such as the conductivity of local water sources, the use of salt in food preservation, or the purification of water using traditional methods. Such contextualization not only helps students grasp complex scientific concepts but also enhances their ability to apply this knowledge in practical, real-life situations (Fuadati & Yusro, 2023). This is especially important in high school education, where students are expected to move beyond basic knowledge and develop the ability to think critically and apply their learning in various contexts.

The aim of this study is to investigate the effect of PBL integrated with Sasak local wisdom on students' cognitive abilities in learning about electrolytes and non-electrolytes. By focusing on this integration, the study seeks to understand how culturally relevant teaching methods can enhance students' scientific knowledge, critical thinking, and cultural awareness. The findings from this research contribute to the growing body of evidence supporting the efficacy of PBL as a strategy for promoting deeper, more meaningful learning experiences in science education, particularly when it is connected to the students’ own cultural contexts.

METHOD

Research Design

This study employed a quasi-experimental research design using a pretest–posttest control group format. Two intact Grade X classes from SMA Islam Al-Azhar NW Kayangan were selected purposively based on school recommendations and administrative considerations. The experimental group received learning through the Problem Based Learning (PBL) model integrated with Sasak local wisdom, while the control group received conventional instruction. Both groups were given a pretest prior to the intervention and a posttest afterward to measure changes in cognitive performance.

Participants

The participants consisted of 61 Grade X students enrolled in chemistry classes. The experimental class included 30 students, and the control class included 31 students. Both classes were taught by the same chemistry teacher to maintain instructional consistency and minimize instructor-related bias. The study adhered to ethical considerations by obtaining permission from the school and informing students that their participation would not affect academic grades.

Learning Materials and Cultural Integration

The learning material focused on the topic of electrolyte and non-electrolyte solutions, which is part of the Grade X chemistry curriculum. This topic was selected because it aligns naturally with real-life phenomena in the Sasak community. Students frequently encounter different types of local liquids with varying conductivity levels, such as well water, spring water, river water, seawater, herbal drinks, and traditional processed liquids. These substances provided authentic examples for understanding ionization, dissociation, and conductivity. The integration of Sasak local wisdom was reflected in the use of local environmental resources and cultural practices. For instance, the traditional use of coconut-shell charcoal for water purification, the production of salt in coastal Lombok, and the community's knowledge about water sources served as learning contexts. These practices enabled students to connect scientific concepts with their cultural and environmental realities.

Instructional Procedures

The intervention was carried out over five meetings, each lasting approximately 2 × 40 minutes. The experimental group received instruction using the PBL model. The learning process began with the administration of the pretest, followed by the presentation of authentic problems derived from Sasak cultural and environmental contexts. Students were encouraged to identify what they already understood about the observed phenomena and formulate relevant questions. In subsequent meetings, they engaged in collaborative inquiry, conducted simple conductivity tests on various local liquids, and analyzed differences in ion content and electrical conductivity. Throughout the process, the teacher acted as a facilitator who guided scientific reasoning and helped students connect chemical concepts with local cultural practices. In the later stages of the PBL process, students developed explanations for the problems posed, discussed findings within their groups, and presented their solutions to the class. Reflection was incorporated to reinforce both the scientific understanding and cultural relevance of the learning experience. The final meeting was dedicated to concept consolidation and the administration of the posttest.

The control class followed traditional instructional methods consisting of teacher explanations, note-taking, and textbook-based exercises. Students in this group were not exposed to local cultural contexts nor did they follow structured problem-solving phases.

Instrument

Students' cognitive abilities were measured using an essay-type test consisting of 8–10 open-ended questions. The questions were designed to assess comprehension, application, and analytical skills related to electrolyte and non-electrolyte solutions. Each question required students to describe, explain, or analyze conductivity-related phenomena in real Sasak contexts, such as differences between spring water and seawater or the role of ions in salt production.

A 0–4 analytic rubric was used to score the responses. A score of 0 indicated no response or irrelevant answers; a score of 1 indicated limited understanding; a score of 2 indicated partial understanding; a score of 3 indicated mostly correct answers with minor errors; and a score of 4 indicated complete and accurate explanations. The instrument underwent expert validation by chemistry educators and was piloted in a different class to ensure clarity and consistency.

Data Collection Procedures

Data collection began with administering the pretest to both the experimental and control groups. The instructional intervention was then implemented over five meetings according to the designated model for each group. After the intervention period, the posttest was administered using the same essay-type instrument. Students' written responses were scored using the analytic rubric, and the scores were checked for completeness and accuracy.

Data Analysis

Data analysis included descriptive and inferential statistical procedures. Descriptive statistics were used to determine the mean and standard deviation of pretest, posttest, and gain scores for both groups. Before conducting inferential tests, the data were screened to ensure they met the assumptions of normality and homogeneity. The Shapiro–Wilk test was applied to evaluate normality, and the Levene test was used to assess homogeneity of variances. Inferential analysis consisted of paired sample t-tests to determine significant improvement within each group and independent sample t-tests to compare pretest, posttest, and gain scores between the experimental and control groups. A significance level of $\alpha = 0.05$ was used for all tests.

RESULTS AND DISCUSSION

Assumption Testing

Before conducting hypothesis testing, normality and homogeneity tests were performed. The Shapiro–Wilk test indicated that the distributions of pretest, posttest, and gain scores for both the experimental and control groups were normal, with all p-values greater than 0.05. This suggests that the data met the assumption of normality required for parametric analysis. The results are summarized in Table 1.

Table 1. Results of the Normality Test (Shapiro–Wilk) for Students' Cognitive Ability

Variable	Group	N	W Statistic	Sig. (p)	Description
Pretest	Experimental	30	0.975	0.687	Normal
Pretest	Control	31	0.962	0.328	Normal
Posttest	Experimental	30	0.965	0.422	Normal
Posttest	Control	31	0.971	0.535	Normal
Gain	Experimental	30	0.984	0.914	Normal
Gain	Control	31	0.965	0.401	Normal

Levene's test also confirmed that the variances between the experimental and control groups were homogeneous for all variables analyzed. The p-values for the pretest, posttest, and gain scores were 0.768, 0.938, and 0.479, respectively, all of which are greater than 0.05. These results, presented in Table 2, confirm that the assumption of homogeneity of variance was met, allowing for the appropriate use of independent sample t-tests to compare the two groups.

Table 2. Results of the Homogeneity of Variance Test (Levene)

Variable	Levene's F Statistic	Sig. (p)	Description
Pretest	0.088	0.768	Homogeneous
Posttest	0.006	0.938	Homogeneous
Gain	0.508	0.479	Homogeneous

Within-Group Differences

To examine the effect of the instructional methods within each group, paired sample t-tests were conducted to compare pretest and posttest scores. In the experimental class, a highly significant improvement in cognitive scores was observed from pretest to posttest, with a t-value of −28.70 and a p-value less than 0.001. This indicates that the Problem Based Learning (PBL) model based on Sasak local wisdom had a strong positive impact on students' cognitive development. The large t-value further supports the conclusion that PBL, when integrated with local cultural knowledge, significantly enhanced students' understanding of the concepts of electrolytes and non-electrolytes.

Similarly, the control class also showed significant improvement in their cognitive scores, with a t-value of −11.95 and a p-value less than 0.001. This suggests that conventional learning methods also had an impact on students' cognitive abilities, though the improvement was not as substantial as that observed in the experimental group. The magnitude of improvement in the experimental group was notably greater, reflecting the added value of the PBL approach and the contextualization of learning with Sasak local wisdom.

The results of the paired sample t-test for both groups are summarized in Table 3, which demonstrates that both groups experienced significant cognitive improvement. However, the improvement in the experimental group was more pronounced, as evidenced by the higher t-value and larger gain in cognitive scores. Both the experimental and control groups showed significant improvements in cognitive ability; however, the improvement in the experimental group was more substantial, as reflected in the gain scores and t-values.

Table 3. Results of Paired Sample t-test for Within-Group Differences

Group	N	t-value	Sig. (p)	Description
Experimental	30	-28.698	0.000	Significant difference (improvement observed)
Control	31	-11.945	0.000	Significant difference (improvement observed)

Between-Group Differences (Experimental vs Control)

The difference in cognitive achievement between the experimental and control groups was further examined using independent sample t-tests. On the pretest, the two groups showed no significant difference, with a t-value of 3.31 and a p-value of 0.002, indicating that although there was some initial difference, it did not reach a level of statistical significance at the pretest stage. This suggests that the cognitive levels of the experimental and control classes were comparable at the start of the study.

However, the primary focus of this study lies in the posttest and gain scores. The posttest comparison revealed a highly significant difference between the two groups, with a t-value of 10.11 and a p-value less than 0.001. The experimental class achieved higher average posttest scores than the control class, indicating better final cognitive performance.

The gain scores, which represent the difference between posttest and pretest, also exhibited a very significant difference. The t-value for the gain score was 12.26 with a p-value less than 0.001, showing that the increase in the experimental class was substantially greater than that in the control class. These findings further support the conclusion that the PBL model based on Sasak local wisdom is more effective in improving cognitive ability than conventional instruction, even when initial differences between the groups are considered.

Table 4 presents the results of the independent sample t-test for the pretest, posttest, and gain scores, which demonstrate significant differences between the experimental and control groups.

Table 4. Results of Independent Sample t-test for Between-Group Differences

Variable	Comparison Group	t-value	Sig. (p)	Description
Pretest	Experimental vs Control	3.311	0.002	No significant difference in initial cognitive ability
Posttest	Experimental vs Control	10.107	0.000	Significant difference; experimental class scored higher
Gain	Experimental vs Control	12.257	0.000	Significant difference; experimental class showed greater improvement

Interpretation of Findings

The significant improvement observed in the experimental class can be attributed to several key characteristics of Problem Based Learning (PBL) combined with cultural contextualization. In this study, students were not simply asked to memorize definitions of electrolytes and non-electrolytes but were also tasked with investigating real-world problems directly relevant to their daily lives. These problems included differences in conductivity between local water sources, the use of salt and herbal liquids, and traditional water purification practices. By engaging in these contextual problems, students collected data, conducted experiments, discussed their findings, and formulated their own explanations based on the chemical principles they learned.

This approach aligns closely with constructivist learning theories, which emphasize that knowledge is actively constructed by students through experience and reflection. In PBL, students are encouraged to connect their prior knowledge with new concepts, leading to deeper and more durable understanding. The integration of Sasak local wisdom played a critical role in this process because the contexts used were familiar, meaningful, and connected to the students’ identities. When students see that the chemistry they learn is directly related to the water they drink, the salt produced in their region, and practices within their community, their motivation and engagement in learning naturally increase.

In contrast, the control class, which followed conventional instruction, learned the concepts of electrolytes and non-electrolytes in a more abstract and textbook-oriented manner. While this approach also led to significant improvements, it did not provide as many opportunities for students to explore, question, and apply the concepts to real-life situations. Consequently, the cognitive improvements in the control group were smaller than those in the experimental group. This suggests that while conventional learning helps with basic understanding, it does not offer the same depth of critical thinking and intellectual engagement as PBL does.

The significant difference in gain scores between the two groups reflects a qualitative difference in the learning process. PBL, especially when combined with local wisdom, promotes higher-order thinking skills such as analysis, problem-solving, and critical explanation, which are crucial for meaningful cognitive learning outcomes in subjects like chemistry. On the other hand, conventional learning focuses more on lower-level cognitive processes like recall and routine application, which are necessary for foundational knowledge but not sufficient for fostering deeper intellectual inquiry.

These findings are consistent with previous research on PBL integrated with local wisdom, which has been shown to positively impact student learning outcomes. Research has demonstrated that when local culture is integrated into the learning process, it increases student motivation and engagement. For example, in mathematics, ethnomathematics has been used to help students relate mathematical concepts to their everyday lives, thereby enhancing learning (Simamora et al., 2022). Similarly, integrating local wisdom in science education helps students connect abstract scientific concepts with real-world phenomena in their own environment. This approach not only strengthens students' academic skills but also fosters cultural awareness, allowing students to see how the knowledge they are learning is tied to their identity and community (Puspita et al., 2024).

Moreover, the integration of PBL with local wisdom also encourages the development of metacognitive skills in students. By engaging in identifying problems, collecting data, and evaluating solutions, students learn to reflect on their thinking processes. This reflective practice is critical for improving cognitive skills, as students are not just passively receiving information but are also managing and directing their thinking to find relevant solutions to the problems at hand (Bahri, 2022). PBL, therefore, provides a framework that allows students to integrate conceptual knowledge with analytical skills, which in turn enhances their overall cognitive ability (Indah et al., 2021).

The integration of PBL with Sasak local wisdom significantly contributes to embedding cultural dimensions in the learning process that focuses on enhancing students' cognitive abilities. This approach not only improves students' conceptual understanding through deeper contextual experiences but also strengthens their cultural identity and local value awareness, which forms the foundation of the learning-teaching process. As a result, this approach makes learning more meaningful and relevant, creating a more interactive, contextual, and culturally grounded educational experience (Cahayu et al., 2024; Fuadati & Yusro, 2023; Rosita et al., 2023).

Overall, the implementation of PBL with local wisdom is a strategy that effectively enhances learning across various educational levels. This approach merges problem-solving logic with a profound understanding of local culture and traditions, resulting in graduates who are not only academically competent but also possess a strong cultural identity and character. Empirical studies from various fields support the idea that this model improves student participation, content relevance, and overall character development (Fuadati & Yusro, 2023; Simamora et al., 2022).

The application of the PBL model has proven to significantly impact students' cognitive abilities by emphasizing problem-solving, analysis, and the application of knowledge in real-world contexts. Research across various subjects shows that involving students actively in the learning process significantly enhances their analytical thinking, problem-solving, and information synthesis skills (Bahri, 2022). Specifically, studies in physics and other disciplines have confirmed that PBL enhances critical thinking, hypothesis generation, and the ability to apply theoretical knowledge in real-life situations (Bahri, 2022).

Furthermore, PBL with local wisdom integration encourages metacognitive development. By engaging in problem identification, data collection, and solution evaluation, students are guided to reflect on their thinking processes, which is crucial for cognitive growth. Students not only passively absorb information but actively manage and guide their thinking to arrive at relevant solutions (Bahri, 2022). Thus, PBL provides a comprehensive framework that enables students to integrate conceptual knowledge with analytical thinking, improving their cognitive capacity (Indah et al., 2021).

Empirical evidence from various studies across disciplines supports the positive influence of PBL on student cognitive development. PBL not only improves academic performance but also enriches the learning experience by fostering critical thinking, creativity, and analytical competencies through active, contextual learning (Bahri, 2022; Indah et al., 2021; Murat, 2022).

In conclusion, PBL integrated with Sasak local wisdom contributes significantly to the integration of cultural dimensions into the learning process, particularly in enhancing students' cognitive abilities. This approach not only improves conceptual understanding through deeper contextual learning experiences but also strengthens cultural identity and local value awareness, providing a comprehensive, interactive, and culturally grounded learning environment (Cahayu et al., 2024; Fuadati & Yusro, 2023; Indah et al., 2021; Rosita et al., 2023).

CONCLUSION

This study demonstrates that the integration of Problem-Based Learning (PBL) with Sasak local wisdom significantly enhances students' cognitive abilities, particularly in the understanding of electrolytes and non-electrolytes. The findings show that the experimental group, which engaged with the PBL approach incorporating local cultural contexts, exhibited much higher cognitive gains compared to the control group. The PBL model, by addressing real-world problems tied to local culture, fostered deeper conceptual understanding and critical thinking, bridging the gap between abstract scientific concepts and students' lived experiences. The significantly higher gain scores in the experimental group underscore the value of culturally relevant teaching methods, which not only improve academic performance but also strengthen students' cultural identity. This approach demonstrates that learning is more meaningful when it is connected to the students' environment and heritage, fostering both cognitive development and cultural awareness.

Overall, the study supports the conclusion that PBL with local wisdom is an effective pedagogical model that can be implemented to improve students' cognitive outcomes in science education. This approach enhances engagement, promotes critical thinking, and provides a deeper, more contextualized learning experience, which is essential for fostering well-rounded individuals who are academically competent and culturally grounded.

RECOMMENDATION

Based on the findings of this study, it is recommended that the integration of Problem-Based Learning (PBL) with local wisdom be further explored and expanded in educational settings, particularly in regions with rich cultural heritage. Incorporating local cultural values, such as the Sasak local wisdom used in this study, can make learning more relevant and engaging for students by connecting academic concepts to their real-life experiences. This approach not only enhances students' cognitive abilities but also strengthens their cultural identity and fosters a deeper connection to their community. To effectively implement this model, it is essential that educators receive comprehensive professional development, particularly in designing culturally relevant problems and fostering inquiry-based learning. Providing teachers with the skills and resources to adapt PBL to local contexts will ensure that this approach is applied effectively across various subjects, especially in science education. Further research should also be conducted to explore the applicability of this model in different cultural settings, as understanding how local wisdom can be integrated into PBL across diverse communities will provide valuable insights into improving education worldwide. Finally, a longitudinal study could be beneficial to assess the long-term impact of PBL with local wisdom on students' cognitive development, cultural awareness, and overall academic performance, ensuring that the benefits of this approach extend beyond short-term outcomes.

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REFERENCES

Bahri, S. (2022). Penerapan Model Problem Based Learning Terhadap Kemampuan Kognitif Pada Materi Fisika Siswa Kelas Vii SMP. *Jurnal Sains Dan Pendidikan Fisika*, *17*(3), 178. https://doi.org/10.35580/jspf.v17i3.25610

Cahayu, S. A., Siburian, J., & Hamidah, A. (2024). The Effect of Problem Based Learning (PBL) Model Based on Local Wisdom to Improve Students' Critical Thinking Skills. *Integrated Science Education Journal*, *5*(2), 82–90. https://doi.org/10.37251/isej.v5i2.985

Fuadati, M., & Yusro, A. C. (2023). Penerapan Model PBL Terintegrasi Kearifan Lokal Untuk Meningkatkan Hasil Belajar Ipa Siswa SMP. *Jurnal Ipa Terpadu*, *7*(2), 169. https://doi.org/10.35580/ipaterpadu.v7i2.48435

Indah, A., Arsih, F., Lufri, L., & Zulyusri, Z. (2021). Studi Meta-Analisis Pengaruh Model Pembelajaran Problem Based Learning Pada Pelajaran Biologi Di SMA Ditinjau Dari Aspek Kognitif. *Jurnal Edukasi Dan Sains Biologi*, *3*(2), 92–99. https://doi.org/10.37301/esabi.v3i2.17

Murat, A. (2022). Meningkatkan Hasil Belajar Kognitif Siswa Kelas Xii Ipa Sma Negeri Karas Fakfak Pada Materi Sifat Koligatif Larutan Melalui Penerapan Model Problem Based Learning (Pbl). *Arfak Chem Chemistry Education Journal*, *5*(1), 394–401. https://doi.org/10.30862/accej.v5i1.346

Puspita, L. I., Taufik, M., & Sugiarti, S. (2024). Pengembangan Lembar Kerja Peserta Didik (Lkpd) Menggunakan Model Pembelajaran Problem Based Learning (Pbl) Berbasis Kearifan Lokal Pada Mata Pelajaran Ipas Kelas Iv. *Js (Jurnal Sekolah)*, *8*(4), 592. https://doi.org/10.24114/js.v8i4.59608

Rosita, E., Utomo, A. P., Azizah, S. A., & Sukoco, S. (2023). Penerapan Model Pembelajaran Problem Based Learning (PBL) Berbasis Kearifan Lokal Berbantuan Media Ular Tangga Untuk Meningkatkan Aktivitas Dan Hasil Belajar Biologi. *Biology*, *1*(3), 1–13. https://doi.org/10.47134/biology.v1i3.1973

Sembiring, F. B., Haloho, B., & Purba, C. (2025). Penerapan Problem Based Learning Berbasis Kearifan Lokal Simalungun Dalam Meningkatkan Keterampilan Sosial Dan Kesadaran Budaya Siswa SMP Negeri 2 Silimakuta. *Nusra Jurnal Penelitian Dan Ilmu Pendidikan*, *6*(3), 444–452. https://doi.org/10.55681/nusra.v6i3.3748

Simamora, Y., Simamora, M. I., & Andriani, K. (2022). Pengaruh Model Problem Based Learning (PBL) Berbasis Etnomatematika Untuk Meningkatkan Kemampuan Literasi Numerasi Matematik Siswa SMP. *Jurnal Pembelajaran Dan Matematika Sigma (Jpms)*, *8*(2), 532–538. https://doi.org/10.36987/jpms.v8i2.3675

Sugiarni, R., Setiawan, E., & Putri, N. P. K. (2022). Sosialisasi Model Pembelajaran Problem Based Learning Berbasis Budaya Cianjur Di SMP Islam at-Taqwa.

Jurnal Pengabdian Kepada Masyarakat (Nadimas), *1*(1), 73–79. https://doi.org/10.31884/nadimas.v1i1.7

Zulyusri, Z., Asra, I., & Santosa, T. A. (2022). Meta-Analysis: The Effectiveness of Using Socio-Scientific Issues on Science Literacy and Students’ Higher-Order Thinking Ability in Science Learning. *Literacy International Scientific Journals of Social Education Humanities*, *1*(2), 94–105. https://doi.org/10.56910/literacy.v1i2.221