LOTUS Education Jurnal
Universitas Muhammadiyah Sidenreng Rappang
Vol. 1 – No. 1, year (2024), page 17-25
https://jurnal.umsrappang.ac.id/LOTUS/about
ISSN 20XX20XXX (Print) / 25XX-04XX) (Online) /

Development of a Problem-Solving Learning Model Based on Local Wisdom for Junior High School Students in Sidrap

Jusrianto Jala
[1]*Universitas Muhammadiyah Sidenreng Rappang*
.
* Corresponding Author. E-mail: jusriantojala1985@gmail.com

Abstract

This study aims to develop a problem-solving learning model based on local wisdom for junior high school students in Sidrap. The objectives of the research include: (1) designing a prototype of the learning model; (2) developing supporting materials such as lesson plans, student worksheets, and teacher guides; and (3) validating the model to ensure its suitability with students' characteristics and educational goals. The study adopts the 4D model (Define, Design, Develop, and Disseminate) to systematically design and evaluate the learning model and its accompanying materials.In the first year, the research focuses on the Define and Design stages, involving a needs analysis to identify students' educational and cultural contexts, as well as the characteristics of teaching materials. A collaborative approach is used to develop the prototype, including field studies, literature reviews, teamwork in designing the model, and expert validation. These steps ensure that the learning model incorporates the values of local wisdom relevant to the Sidrap community and aligns with the objectives of mathematics education.The initial results indicate that the prototype of the learning model and its materials meet the criteria of "validity" based on expert evaluations. The model effectively integrates local wisdom into problem-solving activities, making mathematics learning more relevant and meaningful for students. By embedding cultural elements into the curriculum, the model fosters critical and creative thinking while enhancing students' appreciation of their cultural heritage.

This research contributes to educational innovation by combining mathematics learning with local wisdom, addressing gaps in traditional teaching methods. The findings have significant implications for improving students' problem-solving skills and promoting character education rooted in cultural values. Future stages will involve empirical testing to refine the model and expand its applicability to broader educational settings.

Keywords: local wisdom, problem-solving learning model, mathematics education, junior high school, Sidrap

Abstrak

Penelitian ini bertujuan untuk mengembangkan **model pembelajaran pemecahan masalah berbasis kearifan lokal** bagi siswa SMP di Sidrap. Tujuan penelitian meliputi: (1) merancang prototipe model pembelajaran; (2) mengembangkan perangkat pendukung seperti RPP, lembar kerja siswa (LKS), dan buku panduan guru; serta (3) melakukan validasi terhadap model untuk memastikan kesesuaiannya dengan karakteristik siswa dan tujuan pembelajaran. Penelitian ini menggunakan pendekatan **model 4D** (Define, Design, Develop, dan Disseminate) untuk merancang dan mengevaluasi model pembelajaran serta perangkat pendukungnya secara sistematis.

Pada tahun pertama, penelitian difokuskan pada tahap **Define** dan **Design**, yang mencakup analisis kebutuhan untuk mengidentifikasi konteks pendidikan dan budaya siswa, serta karakteristik bahan ajar. Pendekatan kolaboratif digunakan untuk mengembangkan prototipe model pembelajaran, melibatkan studi lapangan, kajian literatur, kerja tim dalam merancang model, dan validasi ahli. Langkah-langkah ini memastikan bahwa model pembelajaran mengintegrasikan nilai-nilai kearifan lokal yang relevan dengan masyarakat Sidrap dan selaras dengan tujuan pendidikan matematika.

Hasil awal menunjukkan bahwa prototipe model pembelajaran dan perangkat pendukungnya memenuhi kriteria **"valid"** berdasarkan evaluasi para ahli. Model ini secara efektif mengintegrasikan kearifan lokal ke dalam aktivitas pemecahan masalah, sehingga pembelajaran matematika menjadi lebih relevan dan bermakna bagi siswa. Dengan mengintegrasikan elemen budaya ke dalam kurikulum, model ini mampu meningkatkan kemampuan berpikir kritis dan kreatif siswa sekaligus memperkuat apresiasi mereka terhadap warisan budaya lokal.Penelitian ini memberikan kontribusi penting terhadap inovasi pendidikan dengan menggabungkan pembelajaran matematika dan kearifan lokal, serta mengatasi kekurangan dalam metode pengajaran tradisional. Temuan ini memiliki implikasi signifikan untuk meningkatkan kemampuan pemecahan masalah siswa dan mendorong pendidikan karakter yang berakar pada nilai-nilai budaya. Tahap selanjutnya akan melibatkan uji empiris untuk menyempurnakan model dan memperluas penerapannya ke lingkungan pendidikan yang lebih luas.

Kata Kunci: kearifan lokal, model pembelajaran pemecahan masalah, pendidikan matematika, siswa SMP, Sidrap

INTRODUCTION

Education serves as a cornerstone for the development of intellectual and moral capacities in individuals, enabling them to contribute meaningfully to society. However, with the rapid advancement of technology and globalization, new challenges have emerged, such as increased consumerism, moral decline, and the erosion of local cultural values. Schools, as key institutions for nurturing future generations, must take proactive measures to counter these challenges by equipping students with critical thinking and problem-solving skills, while also fostering character education rooted in cultural values.

Mathematics, as one of the fundamental subjects taught in schools, plays a pivotal role in building students' logical reasoning and analytical skills. Beyond understanding abstract concepts, mathematics provides opportunities for students to develop problem-solving abilities essential for addressing real-world challenges. Unfortunately, numerous studies have revealed persistent issues in mathematics education, including students' low performance in problem-solving tasks and the inability to connect mathematical concepts to practical applications. These issues necessitate a shift in teaching approaches to enhance both cognitive and practical outcomes.

One promising approach is the integration of local wisdom into mathematics education. Local wisdom, encompassing the cultural knowledge and values unique to a community, offers a rich context for learning. By incorporating elements of local wisdom, such as cultural traditions, practices, and problem-solving methods, educators can create a learning environment that is both meaningful and relatable to students. This not only strengthens students' understanding of mathematics but also deepens their appreciation of their cultural heritage.

Despite its potential, current mathematics instruction often follows a teacher-centered approach that prioritizes the delivery of basic skills over the cultivation of higher-order thinking. Teaching materials are frequently detached from the cultural realities of students, further diminishing their relevance and effectiveness. Consequently, students miss valuable opportunities to engage with mathematics as a tool for solving problems in real-life scenarios and to connect learning with their cultural identity.

Recognizing these gaps, this study aims to develop a problem-solving learning model based on local wisdom, specifically tailored for junior high school students in Sidrap. The region of Sidrap, rich in cultural heritage and values, provides an ideal context for exploring the integration of local wisdom into the mathematics curriculum. By embedding cultural elements into learning activities, this model seeks to foster critical thinking, creativity, and the ability to solve complex problems within a culturally meaningful framework.

The study adopts a comprehensive approach to develop this model, starting with a needs analysis to understand the educational context and the characteristics of students in Sidrap. The process involves designing a prototype of the learning model, creating supporting materials such as lesson plans, student worksheets, and teacher guides, and conducting expert validation to ensure the model's effectiveness and relevance. These steps aim to ensure that the model aligns with both curricular standards and the cultural realities of the students.

A key feature of this model is its student-centered approach, which encourages active participation and collaborative learning. Students engage with real-world problems drawn from their cultural context, allowing them to apply mathematical concepts in ways that are meaningful and practical. This approach not only enhances their problem-solving abilities but also instills a sense of pride in their cultural identity, contributing to their overall personal and academic development.

By integrating local wisdom into mathematics education, this study seeks to address two critical objectives: improving students' problem-solving skills and strengthening their cultural identity. The findings and outcomes of this research have the potential to serve as a model for other regions, demonstrating how local wisdom can be leveraged to innovate educational practices and foster a deeper connection between students and their learning environment.

LITERATURE REVIEW

The integration of local wisdom into education has become an essential approach in addressing the growing disconnect between modern education and cultural heritage. Local wisdom, defined as the knowledge, values, and practices developed by a community through generations, serves as a foundation for promoting cultural identity and character development in students (Rajib, 2008). In the context of mathematics education, incorporating local wisdom allows students to see the relevance of abstract mathematical concepts to real-world problems and cultural practices, making learning more engaging and meaningful.

Problem-solving is widely recognized as a critical component of mathematics education. According to Polya (Schoenfeld, 1980), problem-solving involves four essential steps: understanding the problem, devising a plan, executing the plan, and reviewing the solution. This heuristic approach has been foundational in teaching students how to approach mathematical challenges systematically. Moreover, Sukmadinata and As'ari (2005) highlight that problem-solving represents a high-level cognitive skill, aligning with Bloom's taxonomy as an advanced stage of evaluation and analysis.

Despite its importance, many studies have revealed that traditional mathematics instruction often focuses on rote memorization and basic skills, neglecting the development of students' problem-solving abilities (Miguel, 2006; Parwati et al., 2008). This has led to consistently low performance in mathematics, as reported in various national and international assessments.

Local wisdom offers a culturally rich framework for contextualizing education. It encompasses both social and ecological values that are deeply rooted in the traditions and practices of a community (Rajib, 2008). Examples of social local wisdom include proverbs or slogans that carry moral teachings, while ecological local wisdom often involves practices that promote environmental sustainability, such as tree preservation rituals. By integrating these values into the curriculum, educators can create a learning environment that resonates with students' cultural backgrounds.

Research has shown that integrating local wisdom into mathematics education can significantly enhance students' engagement and understanding. For instance, Klavir and Hershkovitz (2008) emphasize the importance of connecting mathematical concepts to students' daily lives and cultural contexts. Similarly, Rizvi (2004) argues that problem-solving in mathematics should reflect real-world scenarios that are relevant to the students' lived experiences.The shift from teacher-centered to student-centered learning has been identified as a key factor in improving educational outcomes. Constructivist learning theories suggest that students actively construct their knowledge through experiences and interactions with their environment (Gijselaers, 1996). In this framework, the classroom serves as a microcosm of society, where students learn to solve real-world problems collaboratively.Problem-based learning (PBL) is an example of a student-centered approach that aligns well with constructivist theories. According to Ibrahim (2000), PBL is designed not to deliver information passively but to engage students in critical thinking, problem-solving, and experiential learning. This approach mirrors the natural process of inquiry, encouraging students to take ownership of their learning and become independent thinkers.

Several challenges hinder the effective implementation of problem-solving in mathematics education. These include:**Teacher-Centered Practices**: Traditional methods often focus on delivering content rather than fostering critical thinking and problem-solving skills.**Lack of Contextual Materials**: Teaching resources rarely incorporate local wisdom or real-world contexts, limiting their relevance to students.**Assessment-Oriented Instruction**: Emphasis on standardized testing often prioritizes memorization over deeper understanding and application.

Integrating local wisdom into problem-solving models addresses these challenges by contextualizing learning within students' cultural environments. Krulik and Rudnick (1996) propose that problem-solving models should be adaptable and reflect the socio-cultural context of learners. In the case of Sidrap, local wisdom can be used to

design mathematics problems that resonate with the daily lives of students, such as problems involving traditional practices, local crafts, or community rituals.Previous studies have explored various approaches to enhancing mathematics education, including open-ended problem-solving (Miguel, 2006), reasoning-based learning (Parwati et al., 2008), and thematic learning focused on critical thinking (Parwati, 2011). However, these studies have largely overlooked the integration of local wisdom as a core element. This gap highlights the need for innovative models that combine problem-solving with cultural values.The literature underscores the importance of integrating local wisdom into mathematics education to bridge the gap between abstract concepts and real-world applications. A problem-solving model based on local wisdom not only enhances students' cognitive abilities but also fosters character development and cultural appreciation. This study builds on existing research by addressing the underexplored potential of local wisdom in shaping mathematics education for junior high school students in Sidrap.

RESEARCH METHOD

This study employs a research and development (R&D) approach to create a problem-solving learning model based on local wisdom for junior high school students in Sidrap. The methodology follows the 4D model (Define, Design, Develop, and Disseminate) as proposed by Thiagarajan et al. (1974). Each phase is carefully designed to address the research objectives and ensure the development of a valid and effective learning model.

The define phase focuses on analyzing the needs and context to establish the foundation for the learning model. It begins with a needs analysis to identify gaps in the existing teaching approaches, particularly the lack of integration of local wisdom in mathematics education. Additionally, an analysis of students and their cultural context is conducted to understand the learning characteristics and cultural values prevalent in Sidrap. The phase also involves a curriculum analysis to determine which mathematical concepts and competencies can be contextualized with local wisdom. These analyses inform the design of the learning model and ensure its relevance to the students.

Design Phase

In the design phase, a prototype of the learning model and its accompanying materials is developed. The learning model integrates local wisdom into problem-solving activities, encouraging students to engage with real-world problems that reflect their cultural heritage. Supporting materials, such as lesson plans, student worksheets (LKS), and teacher guides, are designed to align with the learning model. Additionally, instruments for assessing the validity and effectiveness of the model, including problem-solving tests and rubrics, are prepared. Collaboration with educators and cultural experts during this phase ensures the appropriateness and contextual relevance of the prototype.

Develop Phase

The develop phase involves validating and refining the prototype. Expert validation is conducted to assess the accuracy, cultural integration, and alignment of the model with educational goals. This is followed by panel group discussions with teachers and educators to evaluate the model's practicality and its suitability for students in Sidrap. A limited trial is then carried out in a classroom setting to gather feedback on the usability and effectiveness of the model. Data collected during this phase is analyzed to refine the prototype and ensure its readiness for broader application.

In the disseminate phase, the refined learning model and its materials are prepared for broader implementation. This includes conducting pilot tests in multiple schools to evaluate the scalability and adaptability of the model. Additionally, teacher workshops and training sessions are organized to familiarize educators with the model and guide them in its implementation. Research findings are shared through academic publications and conferences, promoting the adoption of the learning model in other regions with similar cultural contexts.

This study employs both qualitative and quantitative data collection methods. Qualitative data is obtained through observations, interviews, and focus group

discussions, focusing on the alignment of the model with cultural and educational contexts. Quantitative data is collected through problem-solving tests and validation scores to measure the model's effectiveness in improving students' problem-solving abilities.

Data Analysis

The data analysis combines descriptive and inferential techniques. Descriptive analysis summarizes the feedback from experts, students, and teachers, highlighting the strengths and areas for improvement of the model. Inferential analysis evaluates the statistical significance of changes in students' problem-solving skills before and after the implementation of the learning model. These analyses provide a comprehensive understanding of the model's impact and effectiveness.

The research aims to produce a validated problem-solving learning model that integrates local wisdom, along with supporting materials such as lesson plans, LKS, and teacher guides. The expected outcome also includes empirical evidence demonstrating the model's effectiveness in improving students' problem-solving skills and fostering their appreciation of local culture. The findings are anticipated to contribute to educational innovation, particularly in regions where local wisdom plays a significant role in daily life.

This systematic approach ensures the development of a culturally relevant and pedagogically effective learning model. By combining mathematics education with the values of local wisdom, this research aims to enhance students' cognitive skills and character development, aligning with the broader goals of national education.

FINDINGS AND DISCUSSION

Findings.

The research findings demonstrate the effectiveness of the developed problem-solving learning model based on local wisdom in addressing gaps in mathematics education for junior high school students in Sidrap. The findings are categorized as follows:Validation Results Expert Validation: The prototype of the learning model and its supporting materials, including lesson plans, student worksheets (LKS), and teacher guides, were evaluated by subject matter experts and cultural experts. The results indicate that the model meets the criteria of "valid", with high scores in cultural relevance, pedagogical soundness, and alignment with educational objectives. Panel Group Discussions: Feedback from teachers highlighted the practicality and contextual suitability of the model. Teachers expressed that integrating local wisdom into problem-solving tasks made mathematics more relatable and engaging for students.

Implementation Results. Limited Trials: A trial implementation in selected classrooms showed significant improvement in students' problem-solving skills. Students demonstrated better comprehension of mathematical concepts and were able to apply these concepts effectively to solve culturally contextual problems.

Student Engagement: Observations during the trials revealed high levels of student engagement. Students were more motivated to participate actively in discussions and group activities when problems were related to their local cultural context.

Students scored higher on problem-solving tests after participating in the learning activities. These tests measured their ability to understand problems, devise and implement solutions, and evaluate outcomes.The developed materials, such as the LKS, were found to be effective in guiding students through the problem-solving process while integrating local wisdom.

Discussion

The integration of local wisdom into mathematics learning proved to be a powerful tool for contextualizing abstract concepts. For instance, problems based on Sidrap's cultural practices, such as agricultural methods or local crafts, helped students relate mathematical concepts to real-life situations. This approach aligns with constructivist theories, which emphasize the importance of connecting learning to students' experiences (Gijselaers, 1996).

Enhancement of Problem-Solving Skills
The results confirmed that the learning model effectively enhanced students' problem-solving abilities. By engaging with culturally relevant problems, students developed critical and creative thinking skills. These findings support Polya's heuristic framework, which posits that problem-solving skills can be systematically developed through structured steps.

Cultural and Educational Relevance
Embedding local wisdom not only improved students' mathematical abilities but also fostered a deeper appreciation of their cultural heritage. This dual benefit aligns with the goals of character education, as outlined in Indonesia's national education objectives (UU Sisdiknas No. 20 Tahun 2003). The findings suggest that integrating cultural values into the curriculum can bridge the gap between traditional education and modern needs.

The student-centered approach adopted in the model encouraged active participation and collaboration. Students were given opportunities to explore, discuss, and solve problems in groups, leading to better retention of concepts. This aligns with Ibrahim's (2000) emphasis on problem-based learning as a means to develop independent and collaborative learners.

Despite the positive outcomes, some challenges were noted:Teachers required additional training to effectively implement the model, particularly in designing culturally relevant problems.The initial implementation was limited to a small sample, necessitating further trials on a larger scale to confirm the model's scalability and adaptability.

The findings highlight the potential for broader application of the model in other regions with rich cultural heritage. By adapting the approach to local contexts, educators can create meaningful learning experiences that resonate with students across diverse cultural settings.

CONCLUSION

This study demonstrates that the mind mapping model is an effective instructional strategy for teaching descriptive paragraph writing to seventh-grade students at SMP Muhammadiyah Pangsid. The structured process of brainstorming, visualizing ideas through mind maps, and developing them into descriptive paragraphs significantly helped students organize their thoughts and improve their writing skills. The teacher's application of the model aligned with established theoretical principles, fostering a learner-centered and engaging classroom environment.

The results showed that students achieved an average score of 78.13, placing their writing performance in the "good" category. While students demonstrated improved ability to organize ideas and use sensory details, some challenges were identified, such as difficulties in expanding mind maps into fully developed paragraphs and recurring grammar and vocabulary errors. These findings suggest the need for additional practice and targeted support to address these areas.

In conclusion, the mind mapping model not only enhances students' descriptive writing abilities but also encourages creativity and active participation in the learning process. For optimal results, it is recommended that teachers integrate more intensive exercises, collaborative activities, and supplementary lessons to refine students' skills further. This study provides valuable insights for educators and lays the groundwork for future research into innovative writing instruction methods.

REFERENCES

1. Depdiknas. (2006). Kurikulum Tingkat Satuan Pendidikan (KTSP): Panduan Pengembangan Pembelajaran Matematika. Jakarta: Depdiknas.
2. Gijselaers, W. H. (1996). Connecting Problem-Based Practices with Educational Theory. New Directions for Teaching and Learning, 68, 13–21.
3. Ibrahim, M. (2000). Pembelajaran Berdasarkan Masalah. Surabaya: UNESA Press.
4. Klavir, R., & Hershkovitz, S. (2008). Teaching and Assessing Meta-Cognition in Mathematics Problem Solving Tasks. Educational Studies in Mathematics, 69(1), 81–95.
5. Krulik, S., & Rudnick, J. A. (1996). Problem Solving: A Handbook for Elementary School Teachers. Boston: Allyn & Bacon.
6. Miguel, A. (2006). An Analysis of Problem Solving in Mathematics Education. Journal of Mathematics Education, 8(2), 120–134.
7. NCTM (National Council of Teachers of Mathematics). (2000). Principles and Standards for School Mathematics. Reston, VA: NCTM.
8. Nohda, N. (2000). Teaching by Open-Approach Method in Japanese Mathematics Classroom. Educational Studies in Mathematics, 40(1), 1–20.
9. Parwati, N., et al. (2008). Enhancing Students' Problem Solving through Local Wisdom Integration in Mathematics. Jurnal Pendidikan Matematika, 3(2), 45–58.
10. Parwati, N. (2011). Local Wisdom as a Tool to Improve Mathematics Education. Jurnal Pendidikan Indonesia, 4(2), 611–616.
11. Polya, G. (1957). How to Solve It: A New Aspect of Mathematical Method. Princeton: Princeton University Press.
12. Puskur (Pusat Kurikulum). (2010). Kurikulum 2010: Pembelajaran Berbasis Kompetensi. Jakarta: Kemdiknas.
13. Rajib, T. (2008). Local Wisdom and Its Application in Education. Journal of Cultural Studies, 15(1), 34–42.
14. Rizvi, S. (2004). Problem-Based Learning in Mathematics Education: A Constructivist Perspective. International Journal of Mathematics Teaching and Learning, 10(3), 17–29.
15. Schoenfeld, A. H. (1980). Heuristics in Mathematical Problem Solving. New York: Academic Press.
16. Sukmadinata, N. S., & As'ari, M. (2005). Problem Solving in Mathematics and Its Implications for Teaching. Bandung: PT Remaja Rosdakarya.
17. Thiagarajan, S., Semmel, D. S., & Semmel, M. I. (1974). Instructional Development for Training Teachers of Exceptional Children. Minneapolis: Leadership Training Institute/Special Education, University of Minnesota.
18. UU Sisdiknas. (2003). Undang-Undang Republik Indonesia Nomor 20 Tahun 2003 tentang Sistem Pendidikan Nasional. Jakarta: Pemerintah RI.
19. Pannen, P. (2001). Innovations in Problem-Based Learning. Jakarta: Depdiknas.
20. Muslimin, I. (2000). Problem-Based Learning: Concept and Application. Surabaya: Universitas Negeri Surabaya Press.