PROBLEM-BASED LEARNING WITH TRI KAYA PARISUDHA MODEL TO IMPROVE THE MATHEMATICAL PROBLEM-SOLVING SKILLS AND CHARACTER OF ELEMENTARY SCHOOL STUDENTS

I Gede Arya Wiradnyana¹  
I Wayan Lasmawan²  
I Wayan Suastra³  
Ni Ketut Suarni⁴

ABSTRACT

Objective: Problem solving skills and character education are two important things that should be promoted in Indonesia education system. To promote those two things, an effective teaching model is needed. Thus, this research attempts to analyze the effectiveness of Problem-Based Learning with the Tri Kaya Parisudha model to improve elementary school students’ mathematical problem-solving skills and character. This teaching model was developed using Balinese local wisdom concept.

Theoretical Framework: Some theories were used in this study. They were problem-based learning, tri kaya parisudha, problem-solving skills, and characteristics of young learners.

Method: This study used a quasi-experimental approach and involved with 130 students as the study samples. Specifically, the study was conducted by following post-test only control group design. The researchers used questionnaires and problem-solving ability tests to collect the study data. In this study, the questionnaires and post-test results were analyzed using descriptive and inferential statistics. Simultaneously, inferential statistical analysis using the MANOVA test was performed.

Results and Discussion: The analysis shows that problem-based learning with Tri Kaya Parisudha model effectively improves elementary school student's mathematical problem-solving skills and character. Thus, it is recommended that problem-based learning with Tri Kaya Parisudha model to be used by the elementary schools that have problems in improving their students’ mathematical problem-solving skills and character.

Research Implications: Integrating local wisdom in teaching mathematical problem-solving skills and character brings some positive effects for the students.

Originality/Value: Local wisdom is normaly considered as something traditional and not compatible with current era. However, this study found that local wisdom, especially tri kaya parisudha concept is still relevant to our current education system.

Keywords: Problem-Based Learning, Problem-Solving, Student Character, Tri Kaya Parisudha.

¹ Ganesha University of Education, Singaraja, Indonesia. E-mail: arya.wiradnyana@gmail.com  
Orcid: https://orcid.org/0000-0001-8017-1448  
² Ganesha University of Education, Singaraja, Indonesia. E-mail: wayan.lasmawan@undiksha.ac.id  
Orcid: https://orcid.org/0000-0003-1030-2785  
³ Ganesha University of Education, Singaraja, Indonesia. E-mail: iwsuastra@undiksha.ac.id  
Orcid: https://orcid.org/0000-0003-4985-216X  
⁴ Ganesha University of Education, Singaraja, Indonesia. E-mail: niketut.suarni@undiksha.ac.id  
Orcid: https://orcid.org/0000-0003-0112-5123
Problem-Based Learning With Tri Kaya Parisudha Model to Improve The Mathematical Problem-Solving Skills and Character of Elementary School Students

APRENDIZAGEM BASEADA EM PROBLEMAS COM O MODELO TRI KAYA PARISUDHA PARA MELHORAR AS HABILIDADES DE RESOLUÇÃO DE PROBLEMAS MATEMÁTICOS E O CARÁTER DOS ALUNOS DO ENSINO FUNDAMENTAL

RESUMO

Objetivo: Habilidades de resolução de problemas e educação de caráter são duas coisas importantes que devem ser promovidas no sistema educacional da Indonésia. Para promover estas duas coisas, é necessário um modelo de ensino eficaz. Assim, esta pesquisa tenta analisar a eficácia da Aprendizagem Baseada em Problemas com o modelo de Tri Kaya Parisudha para melhorar as habilidades de resolução de problemas matemáticos e caráter dos alunos do ensino fundamental. Este modelo de ensino foi desenvolvido usando o conceito de sabedoria local balinesa.

Estrutura Teórica: Algumas teorias foram usadas neste estudo. Eles eram aprendizagem baseada em problemas, tri kaya parisudha, habilidades de resolução de problemas e características de jovens estudantes.

Método: Este estudo utilizou uma abordagem quase experimental e envolveu 130 alunos como amostras do estudo. Especificamente, o estudo foi conduzido seguindo o projeto do grupo de controle somente pós-teste. Os pesquisadores usaram questionários e testes de capacidade de resolução de problemas para coletar os dados do estudo. Neste estudo, os questionários e os resultados pós-teste foram analisados por meio de estatísticas descritivas e inferenciais. Simultaneamente, foi realizada análise estatística inferencial utilizando o teste MANOVA.

Resultados e Discussão: A análise mostra que a aprendizagem baseada em problemas com o modelo de Tri Kaya Parisudha melhora efetivamente as habilidades e o caráter de resolução de problemas matemáticos do aluno do ensino fundamental. Assim, recomenda-se que a aprendizagem baseada em problemas com o modelo de Tri Kaya Parisudha seja usada pelas escolas de ensino fundamental que têm problemas em melhorar as habilidades matemáticas de resolução de problemas e caráter de seus alunos.

Implicações da Pesquisa: Integrar a sabedoria local no ensino de habilidades matemáticas de resolução de problemas e caráter traz alguns efeitos positivos para os alunos.

Originalidade/valor: A sabedoria local é normalmente considerada como algo tradicional e não compatível com a era atual. No entanto, este estudo descobriu que a sabedoria local, especialmente o conceito de tri kaya parisudha, ainda é relevante para o nosso sistema educacional atual.


APRENDIZAJE BASADO EN PROBLEMAS CON EL MODELO TRI KAYA PARISUDHA PARA MEJORAR LAS HABILIDADES MATEMÁTICAS DE RESOLUCIÓN DE PROBLEMAS Y EL CARÁCTER DE LOS ESTUDIANTES DE ESCUELA PRIMARIA

RESUMEN

Objetivo: Las habilidades de resolución de problemas y la educación del carácter son dos cosas importantes que deben promoverse en el sistema educativo de Indonesia. Para promover estas dos cosas, es necesario un modelo de enseñanza eficaz. Por lo tanto, esta investigación intenta analizar la efectividad del Aprendizaje Basado en Problemas con el modelo Tri Kaya Parisudha para mejorar las habilidades y el carácter matemático de resolución de problemas de los estudiantes de primaria. Este modelo de enseñanza se desarrolló utilizando el concepto de sabiduría local balinesa.

Marco teórico: En este estudio se utilizaron algunas teorías. Era aprendizaje basado en problemas, tri kaya parisudha, habilidades de resolución de problemas y características de los estudiantes jóvenes.

Método: Este estudio utilizó un enfoque quasi-experimental e involucró a 130 estudiantes como las muestras del estudio. Específicamente, el estudio se llevó a cabo siguiendo el diseño de grupo de control solo después de la prueba. Los investigadores utilizaron cuestionarios y pruebas de capacidad de resolución de problemas para
recopilar los datos del estudio. En este estudio se analizaron los cuestionarios y los resultados post-test mediante estadística descriptiva e inferencial. Simultáneamente, se realizó un análisis estadístico inferencial utilizando la prueba MANOVA.

**Resultados y discusión:** El análisis muestra que el aprendizaje basado en problemas con el modelo de Tri Kaya Parisudha mejora efectivamente las habilidades y el carácter matemático de resolución de problemas de los estudiantes de primaria. Por lo tanto, se recomienda que el aprendizaje basado en problemas con el modelo Tri Kaya Parisudha sea utilizado por las escuelas primarias que tienen problemas para mejorar las habilidades y el carácter matemático de resolución de problemas de sus estudiantes.

**Implicaciones de la investigación:** La integración de la sabiduría local en la enseñanza de las habilidades matemáticas de resolución de problemas y el carácter trae algunos efectos positivos para los estudiantes.

**Originalidad/Valor:** La sabiduría local es normalmente considerada como algo tradicional y no compatible con la era actual. Sin embargo, este estudio encontró que la sabiduría local, especialmente el concepto de tri kaya parisudha, sigue siendo relevante para nuestro sistema educativo actual.

**Palabras clave:** Aprendizaje basado en problemas, Resolución de problemas, Carácter estudiantil, Tri Kaya Parisudha.

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### 1 INTRODUCTION

The Indonesian government enforces the 2013 Curriculum at elementary schools to create quality human resources. The implementation of the 2013 curriculum is related to the efforts of the Indonesian government to address developments in life and science in the 21st Century (Arlinwibowo et al., 2021; Rachmadtullah et al., 2020; Suwarma & Kumano, 2019). The government believes that implementing the 2013 curriculum can improve the quality of graduates according to educational goals. Through the 2013 curriculum, educational outputs are expected to produce human resources by strengthening integrated attitudes, skills, and knowledge (Fitriyanti et al., 2021; Novitasari et al., 2019; Siswanto et al., 2019). In addition, another characteristic of the 2013 curriculum is the emphasis on personal experience through observing, asking, trying, reasoning, and communicating (observation-based learning) to increase student creativity (Abdullah et al., 2019; Hidayati et al., 2020; Rahiem & Rahim, 2021).

In implementing the 2013 curriculum in elementary schools, Mathematics, and physical education are two subjects taught partially in terms of time and implementation of learning for high grades (grades IV, V, and VI) (Dewi, 2021; Estiana et al., 2022; Lesmana et al., 2022). The decision to separate Mathematics subjects in high grades in the 2013 curriculum was caused by the integrated Mathematics content in the thematic books being very superficial, so students...
did not get in-depth Mathematical concepts (Rezat et al., 2021; Simorangkir & Tanjung, 2019; Syamsuddin et al., 2021; Wardani et al., 2020). In more detail, the reasons for teaching Mathematics partially in high grades are 1) the characteristics of the object of study and the methods of Mathematics are different from other subjects; 2) Mathematics learning in SD/MI can be improved by learning that is related to the real world context of students; 3) learning Mathematics with themes, limited in accommodating the structure and content of Mathematics as a whole; and 4) Mathematics material presented in books provided by the Bookkeeping Center of the Ministry of Education and Culture is still considered shallow. This ultimately prompted the issuance of Regulation of the Minister of Education and Culture Number 24 of 2016 Chapter 1 Article 1, which states that the Mathematics content in the 2013 Curriculum for high school grades stands alone (Diputra et al., 2019; Hasbi et al., 2019).

As explained above, the reasons for separating the Mathematics subjects seem very logical because if they are still combined, then it is feared that the Mathematics material obtained by students will feel shallow. Students will need help understanding mathematical concepts deeply (Abassian et al., 2020; Kusmaryono et al., 2019; Ulfa & Puspaningtyas, 2020). This will affect the quality of mathematics learning outcomes (Bakker et al., 2021; Dwijayani, 2019; Ulferts et al., 2019). Especially at this time, the results of learning mathematics in Indonesia, especially in problem-solving, have yet to show satisfactory results. This condition is shown by the findings of Trends in International Mathematics and Science Study. Based on the results of a 2015 TIMSS survey of 50 countries in the field of mathematics, Indonesia was ranked 45th with a score of 397, which is still far below the TIMSS standard score of 500 (Fabella & Rosnawati, 2022; Kurniati et al., 2020; Maksum & Khory, 2020). The survey assessed cognitive indicators: knowing, applying, and reasoning. Of all the students surveyed in mathematics, only 4% correctly answered application questions related to problem-solving skills. The TIMSS survey results align with the 2018 Program for International Student Assessment Survey results, placing Indonesia at the bottom. Based on the results of the 2018 PISA survey found that students' value of mathematics is ranked 72 out of 78 countries (Marjan & Sartika, 2022; Ndiung, 2021; Watrianthos et al., 2022).

Apart from being faced with the problem of low mathematical problem-solving skills, sharp criticism of the 2013 curriculum in elementary schools also emerged, along with the lack of maximum implementation of this curriculum in improving student character. Even in terms of its implementation aim, the 2013 curriculum is meant to influence students' character from an early age. This is evidenced by reports submitted by the Indonesian Child Protection Commission from January to April 2019 They found that the violation cases that occurred were
dominated by bullying and physical violence, and based on education level, the majority of cases occurred at the elementary school/equivalent level, namely 25 cases or reaching 67%, 5 cases for junior high school/equivalent level, 6 cases for senior high school/equivalent level and 1 case for Higher Education. The Indonesian Child Protection Commission report describes that at the elementary school level, the first level of education should be the initial foundation for building children's character. It dominates cases of physical violence. This report is in line with the LBH-APIK Bali report in 2016, which reported an increase in violence involving children and women from 87 cases in 2015 and then increased to 100 cases in 2016. Of course, these two reports can be one indicator of failure in character education in elementary schools.

The condition also occurs in elementary school students in Buleleng District, Buleleng Regency. Based on preliminary research conducted in several schools that have implemented the 2013 curriculum through observation, interviews, and documentation studies, it was found that several problems arose in teachers' implementation of mathematics learning. First, the ability to solve problems has yet to be optimally accommodated in the learning process, so students are less able to solve problems based on real life. However, one of the primary objectives of studying mathematics is to have the capacity to solve problems (Kong et al., 2021; Myers et al., 2023; Taranto et al., 2022). In addition, the learning provided by the teacher is still dominated by memorizing concepts, so students are less able to apply these concepts in solving problems that require problem-solving (Krishnan et al., 2021; Simamora et al., 2018).

Second, the learning model still needs to integrate character education that originates from local wisdom values. According to the findings of interviews with school principals, the problem was that teachers needed help integrating character education when carrying out learning activities. Integrating character education is very important because educators are one of the factors that significantly influence the formation of children's character, apart from parents (Gaol & Sitepu, 2020; Paul et al., 2022; Septiwiharti, 2023). In addition, character education in elementary schools has been developed partially and not comprehensively. An indoctrinated approach and modeling alone are insufficient because it is difficult to determine the most appropriate figure to serve as a role model (Aningsih et al., 2022; Berges-Puyo, 2020; Khadijah et al., 2021). Third, the problem of character formation in children is also a severe problem the school faces. For example, cases of bullying still often occur in elementary schools and affect both boys and girls. In addition, the courtesy of students has also begun to fade. This can be observed in the behavior of students, especially in the way they talk to each other, attitudes towards teachers at school, and the use of harsh words that are inappropriate for children to say.
Based on the explanation above, it can be understood that the problems faced by the school related to character building are closely related to character ownership based on Tri Kaya Parisudha's values. For example, the bullying problem in elementary schools is evidence of weak self-control originating from action (kayika). Likewise, the way of talking to each other, their attitudes towards teachers at school, and throwing harsh words that children inappropriately speak are evidence of weak self-control originating from words (wacika) (Ariawan et al., 2020, 2022; Divayana et al., 2019).

Starting from the problems above, a solution to these problems must be sought immediately. Therefore, researchers offer a solution by developing a learning model filled with local wisdom to optimize students' mathematical problem-solving abilities and character values. More specifically, this research developed a Problem-based Learning (PBL) model by collaborating with Tri Kaya Parisudha (TKP) content. The local wisdom of TKP is suitable for implementing the 2013 curriculum (Amrita et al., 2022; Ariawan & Divayana, 2020; Indrawan et al., 2019; Nirmayani & Dewi, 2021; Priantini, 2021; Suwindia et al., 2022; Yeni et al., 2019). Using the TKP concept in learning allows students to deliver positive changes toward the noble characteristics expected in education (Masdiantini et al., 2020).

Through the collaboration of the PBL learning model with TKP theoretically, students' mathematical solving abilities can be improved, as well as their character. This is because the PBL learning model with TKP pays attention to three stages of human action, namely thinking (manacika), saying (wacika), and behaving properly and correctly (kayika). Through these stages, all children's activities will be directed at positive things to create a more active learning atmosphere in finding concepts so that students feel happy and motivated to achieve positive mathematics learning outcomes. PBL with TKP content can foster students' self-confidence to dare to express ideas. The confidence to dare to express ideas is important for students to communicate with others so they can solve the problems they face (Ariawan & Divayana, 2020).

Based on the description above, it is necessary to develop a PBL with TKP model to improve the mathematical problem-solving skills and character of fifth-grade students at primary school in Buleleng District, Buleleng Regency. For this reason, it is necessary to conduct further research on the "Effectiveness of the PBL model with TKP in improving the mathematical problem-solving skills and character of fifth-grade elementary school students."
2 METHOD

2.1 RESEARCH DESIGN

This research can be classified as a quasi-experimental research. This study is classified into quasi experimental, because the samples of the study were taken from two intact groups. They were the students from different class. Specifically, this study followed the posttest-only control group design. It means that one group was treated as the experimental group and the other group was treated as the control group. The experimental group was taught using the Problem-Based Learning with the Tri Kaya Parisudha model while the control group was taught using the conventional teaching model. Then, the two groups were given a post-test to measure their performance.

2.2 SAMPLE AND DATA COLLECTION

The sample for this research was selected using a purposive sampling technique by considering the learning model used in schools. In this research, there were 67 students in the experimental class and 63 in the control group. This study used data collection methods such as a problem-solving ability test and a questionnaire on TKP character values. The character values questionnaire was developed by the researcher regarding indicators that include: positive thinking, religious, believing in the law of cause and effect (karmaphala), speaking politely, telling the truth, compassion, being honest, caring for others and the environment, and discipline.

TKP character values instruments were developed and tested by the Content Validity Ratio (CVR), and the results show that 30 items are declared valid. Furthermore, the reliability test using Alpha Cronbach and following Kerlinger's theory that reliability is at least 0.70 shows that out of 30 statement items, 27 are declared valid with a reliability value of 0.876. Data collection on problem-solving abilities is carried out through tests with four indicators, including understanding the problem, planning a solution strategy, implementing a resolution strategy, and reviewing it. The four indicators are translated into 15 essay questions. After the problem-solving ability instrument was developed, its validity and reliability were tested using SPSS 17, showing that out of 15 items in the problem-solving ability instrument, there are ten valid items and a reliability value of 0.714.
2.3 ANALYZING OF DATA

Post-test data collected in this study were analyzed using descriptive includes: mean, standard deviation, and variance. In this study, the inferential statistical analysis used was the MANOVA test. Prior to performing the MANOVA test, the following tests were performed: the normality test using Kolmogorov-Smirnov and Shapiro-Wilk tests, the homogeneity test using the Levene's test of equality of error variance, and the multi-correlation test. The F-test was used to test the hypothesis through MANOVA. The multivariate test will display the effect of each source on the dependent variable, namely mathematical problem-solving abilities and character values.

3 RESULTS

This study showed a significant difference between students treated with the PBL with the TKP model and those not treated with this model or using the PBL learning model. The analysis results showed differences in the mean in problem-solving ability and character between the experimental and control groups, each with a score of 5.18 and 6.67 (see Table 1).

Table 1
Descriptive Analysis of Problem-Solving Ability and Character Value.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Dependent Variable</th>
<th>N</th>
<th>Min.</th>
<th>Max.</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>PBL with TKP</td>
<td>problem-solving skill</td>
<td>67</td>
<td>68</td>
<td>99</td>
<td>85.04</td>
<td>6.572</td>
</tr>
<tr>
<td></td>
<td>character values</td>
<td>67</td>
<td>68</td>
<td>93</td>
<td>81.54</td>
<td>4.419</td>
</tr>
<tr>
<td>Without TKP</td>
<td>PBL problem-solving skill</td>
<td>60</td>
<td>60</td>
<td>99</td>
<td>79.86</td>
<td>10.210</td>
</tr>
<tr>
<td></td>
<td>character values</td>
<td>60</td>
<td>65</td>
<td>88</td>
<td>74.87</td>
<td>4.702</td>
</tr>
</tbody>
</table>

Source: Data Analysis

The next step is to perform a MANOVA analysis on the post-test data. Before the MANOVA test was carried out, prerequisite tests were first carried out: the normality test, homogeneity test, and multi-correlation test. The normality test shows that all group data are normally distributed. The value of Sig indicates this. > 0.05 (see Table 2). After meeting the normality requirements, a homogeneity test is carried out using Levene's equality test. The homogeneity test results show that the data is homogeneous, where each test shows a value of more than 0.05. Sig. Levene's Test of Equality value is 0.433 for problem-solving abilities, while the value of Sig. Character values are 0.423. The next test is multi-correlation. The results
of multi-correlation showed that all data tolerance values were > 0.1 and VIF values < 1.000 for each data group. Thus, it can be concluded that all data does not have multicollinearity.

**Table 2**

*Normality Test Results.*

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Character values</th>
<th>Problem-solving skill</th>
</tr>
</thead>
<tbody>
<tr>
<td>PBL with TKP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>67</td>
<td>67</td>
</tr>
<tr>
<td>Normal Parameters&lt;sup&gt;a,b&lt;/sup&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>81.90</td>
<td>81.54</td>
</tr>
<tr>
<td>Std. Deviation</td>
<td>4.352</td>
<td>4.419</td>
</tr>
<tr>
<td>Most Extreme Differences</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Absolute</td>
<td>.146</td>
<td>.158</td>
</tr>
<tr>
<td>Positive</td>
<td>.146</td>
<td>.158</td>
</tr>
<tr>
<td>Negative</td>
<td>-.123</td>
<td>-.140</td>
</tr>
<tr>
<td>Kolmogorov-Smirnov Z</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asymp. Sig. (2-tailed)</td>
<td>.115</td>
<td>.069</td>
</tr>
</tbody>
</table>

| Without PBL with TKP             |                  |                      |
| N                                | 63               | 63                   |
| Normal Parameters<sup>a,b</sup>  |                  |                      |
| Mean                             | 74.87            | 74.68                |
| Std. Deviation                   | 4.702            | 4.652                |
| Most Extreme Differences         |                  |                      |
| Absolute                         | .166             | .167                 |
| Positive                         | .094             | .099                 |
| Negative                         | -.166            | -.167                |
| Kolmogorov-Smirnov Z             |                  |                      |
| Asymp. Sig. (2-tailed)           | .062             | .059                 |

Source: Data Analysis

The F-test was used to test the hypothesis through MANOVA. The analysis reveals that the F values for Pillai’s trace, Wilks' lambda, Hotelling's trace, and Roy's largest root test are all less than 0.001, indicating they are all significant (see Table 3). As a result, the PBL with TKP model significantly impacts elementary school students' problem-solving abilities and character in mathematics. The Test of Between-Subjects Effects, which looks for the relationship between the learning model (A) and problem-solving ability (Y1), shows an F value of 78.191 with a significance of 0.000 <0.001 (see Table 4). This shows a significant effect of using PBL with TKP models on students' problem-solving abilities. Likewise, the relationship between the learning model (A) and character values (Y2) shows an F value of 69.401 with a significance of 0.000 <0.001. Therefore, it can be said that the PBL with TKP model significantly affects students' character values. These results also indicate a significant effect of the PBL with TKP model on problem-solving abilities and character values. Calculations to determine the effectiveness of the PBL with TKP model on problem-solving abilities and
Problem-Based Learning With Tri Kaya Parisudha Model to Improve The Mathematical Problem-Solving Skills and Character of Elementary School Students

character values of fifth-grade elementary school students in Buleleng Regency using the t-test are shown in Table 5.

Table 3

The Result of Multivariate Analysis.

<table>
<thead>
<tr>
<th>Effect</th>
<th>Multivariate Testsb</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Value</td>
</tr>
<tr>
<td>Intercept</td>
<td>Pillai's Trace</td>
</tr>
<tr>
<td></td>
<td>Wilks' Lambda</td>
</tr>
<tr>
<td></td>
<td>Hotelling's Trace</td>
</tr>
<tr>
<td></td>
<td>Roy's Largest Root</td>
</tr>
<tr>
<td>A</td>
<td>Pillai's Trace</td>
</tr>
<tr>
<td></td>
<td>Wilks' Lambda</td>
</tr>
<tr>
<td></td>
<td>Hotelling's Trace</td>
</tr>
<tr>
<td></td>
<td>Roy's Largest Root</td>
</tr>
</tbody>
</table>

Table 4

Tests of Between-Subjects Effects.

<table>
<thead>
<tr>
<th>Tests of Between-Subjects Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Source</td>
</tr>
<tr>
<td>Corrected Model</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Intercept</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>A</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Error</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Total</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Corrected Total</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

Table 5

Results of t-test Analysis.

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1Y1</td>
<td>67</td>
<td>81.54</td>
<td>4.419</td>
<td>8.616</td>
<td>0.000</td>
</tr>
<tr>
<td>A2Y1</td>
<td>63</td>
<td>74.68</td>
<td>4.652</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A1Y2</td>
<td>67</td>
<td>81.90</td>
<td>4.352</td>
<td>8.843</td>
<td>0.000</td>
</tr>
<tr>
<td>A2Y2</td>
<td>63</td>
<td>74.87</td>
<td>4.702</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A1Y1Y2</td>
<td>67</td>
<td>81.72</td>
<td>4.373</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A2Y1Y2</td>
<td>63</td>
<td>74.78</td>
<td>4.659</td>
<td>12.387</td>
<td>0.000</td>
</tr>
</tbody>
</table>
Based on Table 5, it can be seen that: the t value of problem-solving ability is calculated from the root of F MANOVA (FAY1), namely 8.616; 2-tailed significance value (2-tailed) 0.000 < 0.001. It means there is a significant difference in problem-solving abilities between the experimental group (A1) and the control group (A2). The average value for A1Y1 is 81.54 > A2Y1 is 74.68, so the model PBL with TKP is more effective in increasing problem-solving skills compared to the PBL model; the t value of character values calculated from the root of F MANOVA F(AY2) is 8.843; 2-tailed significance value 0.000 < 0.001. This means that there is a significant difference in the character values (Y2) between the experimental group (A1) and the control group (A2), where the average value for A1Y2 is 81.90 > A2Y2 is 74.87, meaning that the PBL with TKP model is more effective in increasing values. Character values compared to the PBL model; (3) the simultaneous t value calculated from the root of F Wilks' lambda A, namely 12.387; 2-tailed significance value 0.000 < 0.001. This means that there is a significant difference in problem-solving ability (Y1) and character values (Y2) between the experimental group (A1). The control group (A2), where the average value for A1Y1Y2 is 81.72 > A2Y1Y2 is 74.78, meaning that the PBL model is loaded TKP is simultaneously more effective in enhancing problem-solving skills and character values compared to the PBL model.

4 DISCUSSION

The results of this study show that the PBL with TKP model effectively increases problem-solving skills. The effectiveness of this learning model must be distinct from the steps of the model or the activities carried out in the learning process (Ariawan & Divayana, 2020). The PBL model with TKP content is a model that can train students to control the thoughts, words, and actions that students carry out during learning (Ariawan et al., 2020). This model also believes that thoughts underlie one's words and actions. In principle, this model sees that good thoughts (manacika) will underlie good words (wacika) so that good deeds (kayika) are also realized. From that principle, the first thing humans have to control is their minds. Therefore, in applying this model, the teacher is directed to keep students' minds focused so that they can solve given problems because problem-solving as an action originates from the mind (Nirmayani & Dewi, 2021; Suwindia et al., 2022).

In its implementation, the PBL with TKP model will be applied to every interaction in the learning process to improve students' problem-solving skills. Implementing the Manacika concept (good thinking) in learning is done by accustoming students to positive thinking through reading carefully and in-depth about every problem given during learning before
making a problem-solving plan and discussing the problem (Priantini, 2021). To keep students' minds focused during learning activities, the teacher invites students to read and examine the problems to be solved in the Student Performance Sheet. Reading and looking at existing problems requires the ability to understand the problems (Masdiantini et al., 2020). The ability to analyze what is already known and what is being asked in the problem. In the Wacika section (saying well), students are guided to speak/communicate well. Talking/communicating is done between fellow students or between students and the teacher to convey the results of understanding the problems given. In addition, students can ask each other and add and respect the opinions of the parties involved in learning. Finally, in the kayika (doing good) section, students work on or carry out a problem-solving plan based on the results of the thoughts and discussions that have been carried out. In addition, students can act actively in learning, such as actively coming to the front of the class to appear to solve a given problem. These activities support the learning course, especially in solving problems for the better. This is because of good thoughts (focus) and good words so that students can solve problems given by the teacher (Cooper et al., 2021; Rowe et al., 2020; Wicaksono et al., 2019).

The findings of similar research showing that learning that contains TKP can improve problem-solving abilities is research conducted by Ariawan & Divayana (Ariawan & Divayana, 2020) which reveals that learning models that contain TKP can increase problem-solving abilities. Furthermore, learning that includes TKP give students close to their surroundings and relevant to the material that students are expected to master (Astawan et al., 2020). When students face problems, they develop a sense of responsibility to solve them, so they are aware of the importance of gathering relevant information to solve the problems they face. (Balan et al., 2019; Novalinda et al., 2020).

The second finding in this study shows that the PBL with TKP model effectively increases character values. The character values studied in this study originate from Balinese local wisdom, TKP. The character values in question originate from thoughts or manacika, words or wacika, and actions or kayika. Character values reflecting manacika aspects are measured through character values: positive thinking, being religious, and believing in the law of karmaphala (cause and effect law). Character values reflecting wacika aspects are measured through character values: (1) speak politely and (2) speak honestly, while the character that reflects the kayika aspect is measured through character values: (1) compassion, (2) being honest, (3) caring for others and the environment, and (4) discipline. If the character values originating from manacika, wacika, and kayika are owned by elementary school children, then other characters will automatically follow. In learning with the PBL model containing TKP,
students are taught good habits that lead to controlling thoughts, words, and actions, as taught by TKP (Astawan et al., 2020; Masdiantini et al., 2020; Priantini, 2021). The teacher in the PBL with TKP model plays an important role as a model that students can emulate. Therefore, teachers must be able to guide students in thinking, saying, and doing good. This is because the characteristics of students in elementary school are individuals who are in the phase of imitating and looking for models in adults. This model is also supported by a conducive social system involving multiple interactions in cooperation between students, teachers and students, and groups. The social system is also built by providing opportunities to express opinions in good and correct (communicative) language. Through these activities, students will get used to applying character values that reflect controlling thoughts, words, and actions.

The second finding in this study shows that the PBL with TKP model influences character values. In line with research conducted by Ariawan et al. (Ariawan et al., 2022), which states that TKP, as one of the teachings of Hinduism which contains Hindu religious norms, is very relevant to implementation in the field of education to deliver positive changes towards the noble characters expected in education itself. Research conducted by Masdiantini et al. (Masdiantini et al., 2020) states that TKP can build ethical, moral, and honest behavior in acting.

The third finding in this study shows that the PBL with TKP model is simultaneously effective in improving problem-solving abilities and character values. This is because the PBL model with TKP pays attention to three stages of human action, namely thinking (manacika), saying (wacika), and behaving properly and correctly (kayika). Through these stages, all children's activities will be directed at positive things so that a more active learning atmosphere can be created in finding concepts so that students feel happy and motivated to solve mathematical problems. In addition, using PBL built on collaborative learning experiences and promoting good relationships between peers is very effective for growing their confidence in learning (Bada & Jita, 2022; Han et al., 2022; Ma et al., 2020; Suseelan et al., 2022; Tanjung et al., 2022; Umar & Ko, 2022; Yang, 2023). This self-confidence also greatly supports students' ability to solve problems. In addition, the content of TKP, which is designed to make kayika, wacika, and manacika the foundation of moral ethics during learning activities, also supports the process of growing character values. In its application, teachers and students always try to think well and right (manacika) during learning, and teachers and students try to speak well and write (wacika). Teachers and students always try to do good and correctly (kayika) during learning. The third finding in the study showed that the PBL with TKP model was simultaneously effective in improving problem-solving skills and character values. It is in line with several previous studies which stated that the integration of local cultural wisdom in
learning could improve student learning outcomes and character outcomes (Krisna et al., 2020; Toharudin et al., 2021; Tohri et al., 2022; Uge et al., 2019; Wati et al., 2020; Wiradnyana et al., 2022).

5 CONCLUSIONS

The PBL with TKP model significantly affects students' mathematical problem-solving abilities and character values. The PBL model with TKP pays attention to the three stages of human action, namely thinking (manacika), saying (wacika), and behaving properly (kayika). They are motivated to solve math problems. In addition, the content of TKP, which is designed to make kayika, wacika, and manacika the foundation of moral ethics during learning activities, also supports the growth of character values. Therefore, the PBL with TKP model is recommended to be applied as an innovative learning model in elementary schools. Thus, the findings in this study indicate that students' problem-solving abilities and character are closely related to the behavior shown by the teacher during learning. Teachers who can control their thoughts, words, and actions or, in Hindu teachings, called TKP during learning, greatly help students learn mathematics, especially in solving math problems. This study also showed that students who learned with the PBL model with TKP showed a positive character during learning, and their problem-solving ability increased. In addition, the findings of this study indicate that there is a need for the school principal as a policy maker to improve student character in and outside the classroom. With the development of this model, this can be realized.

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Problem-Based Learning With Tri Kaya Parisudha Model to Improve The Mathematical Problem-Solving Skills and Character of Elementary School Students


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