Analysis of Teacher Response to Problem Based Learning Model and Scaffolding Model in Science Subjects

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ABSTRACT

Purpose of the study: This study aims to evaluate teachers' responses to two learning models, namely problem-based learning and scaffolding, in the context of science subjects at Junior High School Negeri Satu Atap Pematang Jering.

Methodology: The methodology used was descriptive quantitative research with a population of teachers in the school. The research sample consisted of 16 teachers selected by purposive sampling. Data were analyzed using descriptive statistics.

Main Findings: The main finding of this study shows that most teachers (75%) in Junior High School Negeri Satu Atap Pematang Jering responded positively to the use of problem-based learning and scaffolding models in science learning. These results indicate that both learning models effectively improve the quality of teaching and students' understanding of science materials.

Novelty/Originality of this study: The novelty of this research lies in its specific focus on analyzing teachers' responses to problem-based learning and scaffolding models. This research contributes to the existing literature in this field by providing a deeper understanding of how these two learning models can be applied in science learning in secondary schools. The results of this study can serve as a guideline for teachers and schools in selecting and implementing effective learning strategies to improve teacher competence and student learning outcomes in science subjects.

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1. INTRODUCTION

Education is needed to develop and educate humans. Education plays a major role in the journey of life to develop one's potential [1], [2]. Education is knowledge and learning that occurs throughout life in all places and situations, with the aim of having a positive impact on the development of each individual [3]–[5]. Education does not only involve the transfer of knowledge, but also values that aim to form qualified and educated individuals [6]–[8]. Natural Science is one of the subjects that has an essential role in the world of education.

Science subjects must be taught starting from elementary school level to high school level. Science learning involves in-depth observation of natural phenomena that include both living and non-living things [9], [10]. Science learning aims to spur the development of students' intelligence and intellectual experience [11], [12]. Science learning can develop students' potential to be more active and creative in learning [13]–[15]. To be able to develop students' potential to be more active and creative in learning, a problem-based learning model and a scaffolding model are needed.

Problem-Based Learning (PBL) is a learning approach that can support students' active involvement in the learning process. The problem-based learning approach is highly recommended because it can produce a more significant and meaningful learning process [16]. Through the problem-based learning model, students are encouraged to become independent and critical learners, and improve students' analytical thinking skills [17], [18]. The problem-based learning model directs students as the main actors in the learning process, where they are confronted with real situations and encouraged to find solutions through the application of understanding and knowledge they have acquired and developed [19].

Scaffolding learning strategy is an effective approach to develop students' independence in the learning process. Scaffolding is a process of interaction between educators and learners with the aim of helping learners who face difficulties in the learning process [20]. The main goal of scaffolding is to gradually increase students' understanding and skills [21]. According to Wahyuni, [22] the scaffolding learning model provides assistance tailored to the level of difficulty faced by students.

This study aims to determine the results of teacher responses to problem-based learning models and scaffolding models in science subjects. In this study, the novelty lies in analyzing teacher responses to problem-based learning and scaffolding models in science subjects. This is due to the analysis of responses from users with a focus on teachers, especially in the application of problem-based learning and scaffolding models that are applied to improve the competence of teachers in teaching science subjects. Therefore, this research will complement previous research in this field.

2. RESEARCH METHOD

This research uses a quantitative approach. According to Wulandari and Efendi [23] Quantitative research is a research approach whose analysis focuses more on numerical data processed using statistical methods. The research design applied is a survey, in which this research collects data from respondents through a questionnaire [24]. The survey approach was used to gather data related to the views, choices, actions, and demographic profiles of the respondents.

According to Unaradjan [25] population is an object or subject that is in an area and meets certain criteria related to the issue being studied. The population in this study were all teachers of State Junior High School Satu Atap Pematang Jering. According to Unaradjan [25] The sample is part of the population that has certain characteristics or conditions that will be studied. The sampling technique that researchers use is purposive sampling. According to Lenaini [26] purposive sampling is a non-random sampling method where the researcher ensures the quotation of illustrations through the method of determining specific identities that are in accordance with the research objectives so that it is expected to respond to the research case. The sample in this study amounted to 16 teachers at Junior High School Negeri Satu Atap Pematang Jering who had implemented the problem-based learning model and the scaffolding model in science subjects.

The instrument used by researchers is a questionnaire or questionnaire sheet. This questionnaire sheet consists of 10 questions. The data collection technique used in this study is a non-test instrument in the form of a questionnaire response to the problem-based learning model with the scaffolding model adapted from the questionnaire [27]. The grids of the PBL model questionnaire sheet with the scaffolding model are in table 1 below.

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Educator behavior</th>
<th>Question number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orient students to the problem</td>
<td>Determine the Zone of Proximal Development (ZPD) or level of student development based on their cognitive level, explain learning objectives, explain the logistics needed, and motivate students to engage in problem-solving activities.</td>
<td>1,2</td>
</tr>
<tr>
<td>Organizing students to learn</td>
<td>Help students define and organize learning tasks related to the problem.</td>
<td>3,4</td>
</tr>
<tr>
<td>Guiding individual or group experience</td>
<td>Encourage students to gather appropriate information, carry out experiments to obtain explanations and solve problems, direct learners with high ZPD to help learners with low ZPD.</td>
<td>5,6</td>
</tr>
<tr>
<td>Developing and presenting work</td>
<td>Assist students in planning and preparing appropriate work such as reports, and help them by giving directions and assistance to share tasks with friends.</td>
<td>7,8</td>
</tr>
<tr>
<td>Analyze and evaluate the problem-solving process</td>
<td>Helping students to reflect or evaluate on the investigation, and the process they used.</td>
<td>9,10</td>
</tr>
</tbody>
</table>

This questionnaire instrument uses a 5 Likert scale, namely "strongly agree with a score of 5", "agree with a score of 4", "neutral with a score of 3", "disagree with a score of 2", “strongly disagree with a score of 1”. The assessment on this questionnaire sheet is categorized in table 2.

<table>
<thead>
<tr>
<th>Categories</th>
<th>Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly agree</td>
<td>43-50</td>
</tr>
<tr>
<td>Agree</td>
<td>35-42</td>
</tr>
<tr>
<td>Neutral</td>
<td>27-34</td>
</tr>
<tr>
<td>Disagree</td>
<td>19-26</td>
</tr>
<tr>
<td>Strongly disagree</td>
<td>10-18</td>
</tr>
</tbody>
</table>

Table 2. Categories of questionnaire sheet assessment

Data collection was carried out by distributing questionnaire sheets to each teacher at Junior High School Negeri Satu Atap Pematang Jering. The data analysis technique in this study used descriptive statistics. According to Sholikhah [28] descriptive statistics are statistics that have the task of organizing and analyzing data, numbers, in order to provide an organized, concise, and clear description of a symptom, event or situation, so that certain understanding or meaning can be drawn. Descriptive statistics in this study are used to measure standard deviation, mean, mode, median, minimum value and maximum value.

This study was conducted to determine the results of teacher responses to problem-based learning models and scaffolding models in science subjects. The research began by conducting an initial study and literature study to see the facts in the field. After that, determine the population and sample. The sampling technique that researchers use is purposive sampling. Furthermore, preparing the instrument, the instrument used by researchers is a questionnaire sheet. The instrument is adapted from previous research. Data collection is done by distributing questionnaire sheets to teachers, then teachers fill out the questionnaire sheets. After the data is collected, data testing is carried out to see how the teacher's response to the problem-based learning model and the scaffolding model in science subjects.

Based on the descriptive results of table 3, it is known that the teacher's response to the PBL model with the scaffolding model at Junior High School Negeri Satu Atap Pematang Jering can be seen in table 3.

<table>
<thead>
<tr>
<th>Interval</th>
<th>Categories</th>
<th>F</th>
<th>%</th>
<th>Mean</th>
<th>Median</th>
<th>Modus</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>43-50</td>
<td>Strongly agree</td>
<td>12</td>
<td>75</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>35-42</td>
<td>Agree</td>
<td>4</td>
<td>25</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>27-34</td>
<td>Neutral</td>
<td>0</td>
<td>0</td>
<td>44.6875</td>
<td>44.5000</td>
<td>43.00</td>
<td>39.00</td>
<td>50.00</td>
</tr>
<tr>
<td>19-26</td>
<td>Disagree</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10-18</td>
<td>Strongly disagree</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Based on the descriptive results of table 3, it is known that the teacher's response to the PBL model with the scaffolding model at Junior High School Negeri Satu Atap Pematang Jering with a percentage of 75% in the strongly agree category. Also obtained an average of 44.6875, median 44.5000, mode 43.00, minimum value 39.00, and maximum value 50.00.

The problem-based learning model and scaffolding model have a very important role in education, especially in terms of the role of teachers and student learning experiences. The problem-based learning model encourages students to be active in the learning process, develop the ability to solve various problems, work together in teamwork, and apply their knowledge in real situations [29]. The PBL approach also contributes to deeper understanding and stimulates students' motivation to learn independently [30]. By applying the PBL model, teachers can ensure that students are actively involved in the learning process [31]. Students are faced...
with the challenge of finding solutions to problems, so they must conduct in-depth analysis. This ultimately leads to a stronger understanding and wider application of knowledge.

Scaffolding refers to the set of support or guidance provided by educators to students to support students in overcoming complex tasks or challenges. This support can be in the form of directions, questions, technical assistance, or relevant examples. The main goal of scaffolding is to help students move from a basic level of understanding to a more complex level, as well as helping students develop independence in the learning process. To create an efficient learning environment, it is important for educators to have a solid understanding of how to combine problem-based learning and scaffolding models.

Previous research on problem-based learning model with scaffolding model was conducted by Jatisunda and Nahdi [32] which examined the effect of problem-based learning model with scaffolding technique. Problem-based learning with scaffolding positively influences the improvement of students' problem solving ability compared to problem-based learning without scaffolding. Students who receive problem-based learning with scaffolding have better problem solving skills compared to students who do not get scaffolding in their learning.

The novelty of this study compared to previous studies is the focus on analyzing teacher responses to two learning models, namely problem-based learning and scaffolding models. This study specifically analyzes teachers' responses related to the use of these two models in an effort to improve teachers' teaching skills. Thus, this study will make an important contribution in complementing existing research.

4. CONCLUSION

Based on the results obtained, it can be concluded that the teacher's response to the problem-based learning model with a scaffolding model in science subjects at Junior High School Negeri Satu Atap Pematang Jering with a percentage of 75% in the strongly agree category. This shows that teachers respond positively and well to the use of problem-based learning models with scaffolding models in science subjects at Junior High School Negeri Satu Atap Pematang Jering.

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Analysis of Teacher Response to Problem Based Learning Model and Scaffolding ... (M. Dwi Wiwik Ernawati)