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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 1. Lattice of questionnaire sheet PBL model with seaffolding model

Indicators	Educator behavior	Question number
Orient students to the problem	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.	1,2
Organizing students to learn	Help students define and organize learning tasks related to the problem.	3,4
Guiding individual or group experience	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.	5,6
Developing and presenting work	Assist students in planning and preparing appropriate work such as reports, and help them by giving directions and assistance to share tasks with friends.	7,8
Analyze and evaluate the problem-solving process	Helping students to reflect or evaluate on the investigation, and the process they used.	9,10

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 2. Categories of questionnaire sheet assessment

Categories	Interval
Strongly agree	43-50
Agree	35-42
Neutral	27-34
Disagree	19-26
Strongly disagree	10-18

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.

Figure 1. Research Procedure

3. RESULTS AND DISCUSSION

The results of this study were analyzed using descriptive statistics to determine the standard deviation, mean, mode, median, minimum value and maximum value. The descriptive questionnaire sheet according to the PBL model indicators with the seaffolding model at Junior High School Negeri Satu Atap Pematang Jering can be seen in table 3.

Table 3. Descriptive of PBL model with seaffolding model in Junior High School Negeri Satu Atap Pematang Jering

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

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

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REFERENCES

[1] D. Prasetyo, J. Danurahman, and H. Hermawan, "Implementasi pendidikan kewarganegaraan dalam mewujudkan warga negara baik dan cerdas," *Harmon. J. Pembelajaran IPS dan PKN*, vol. 8, no. 1, pp. 15–23, 2023.

[2] S. F. Zahro, "Peluang media board game ludo prajurit denjaka untuk meningkatkan disiplin siswa," in *Prosiding SEMDIKJAR (Seminar Nasional Pendidikan dan Pembelajaran)*, 2023, vol. 6, pp. 1392–1398.

[3] D. Pristiwanti, B. Badariah, S. Hidayat, and R. S. Dewi, "Pengertian pendidikan," *J. Pendidik. Dan Konseling*, vol. 4, no. 6, pp. 7911–7915, 2022.

[4] N. N. Qoidah, S. Surya, and M. Hidayat, "Investigasi metode mengajar guru di sma n 2 batanghari pada pembelajaran fisika," *KoPeN Konf. Pendidik. Nas.*, vol. 3, no. 2, pp. 138–142, 2021.

[5] A. Astalini, D. Darmaji, D. A. Kurniawan, N. N. Qoidah, M. Zannah, and E. Triani, "Character values of tenth-grade students during learning physics in vector material," *JPI (Jurnal Pendidik. Indones.*, vol. 12, no. 1, pp. 116–123, 2023.

[6] H. Baharun, "Total moral quality: A new approach for character education in pesantren," *Ulumuna*, vol. 21, no. 1, pp. 57–80, 2017, doi: 10.20414/ujis.v21i1.1167.

[7] A. M. R. Antipolo and V. Danilo Jr, "Filipino prospective teachers' experiences in teaching in K12 science curriculum: A cross-sectional research," *JPBI (Jurnal Pendidik. Biol. Indones.*, vol. 7, no. 1, pp. 1–10, 2021.

[8] M. J. Susilo, M. H. Dewantoro, and Y. Yuningsih, "Character education trend in Indonesia," *J. Educ. Learn.*, vol. 16, no. 2, pp. 180–188, 2022, doi: 10.11591/edulearn.v16i2.20411.

[9] M. Suendarti and V. Virgana, "Elevating natural science learning achievement: Cooperative learning and learning interest," *J. Educ. Learn.*, vol. 16, no. 1, pp. 114–120, 2022.

[10] A. Rosidah and W. Widaninngsih, "Penerapan model pembelajaran pjbl (project based learning) pada mata pelajaran ipa di sekolah dasar," *Innov. J. Soc. Sci. Res.*, vol. 3, no. 3, pp. 7415–7423, 2023.

[11] K. Sukarini and I. B. S. Manuaba, "Video animasi pembelajaran daring pada mata pelajaran IPA kelas VI Sekolah Dasar," *J. Edutech Undiksha*, vol. 9, no. 1, pp. 48–56, 2021.

[12] V. P. S. M. Wae and M. B. U. Kaleka, "Implementasi etnosains dalam pembelajaran ipa untuk mewujudkan merdeka belajar di kabupaten Ende," *Opt. J. Pendidik. Fis.*, vol. 6, no. 2, pp. 206–216, 2022.

[13] M. N. Aydede, "Examining the primary school teacher candidates' science learning skills in terms of their attitudes towards science and their science teaching self-efficacy beliefs.," *Int. J. Educ. Methodol.*, vol. 8, no. 4, pp. 853–864, 2022.

[14] A. Rahmawati, R. Triwoelandari, and M. K. Nawawi, "Pengembangan media ispring pada pembelajaran ipa berbasis stem untuk mengembangkan kreativitas siswa," *Edukasi J. Pendidik.*, vol. 19, no. 2, pp. 304–318, 2021.

[15] S. M. Manobe and K. W. Wardani, "Peningkatan kreativitas belajar ipa menggunakan model problem based learning pada siswa kelas 3 SD," *Didakt. Dwija Indria*, vol. 6, no. 8, 2018.

[16] S. Syahlan, I. Malay, and A. Matondang, "Perbedaan model problem based learning dan model kooperatif ditinjau dari kemampuan penalaran matematis siswa," *J. Pendidik. Mipa*, vol. 12, no. 2, pp. 306–314, 2022.

[17] F. N. Habibah, D. Setiadi, S. Bahri, and J. Jamaluddin, "Pengaruh model problem based learning berbasis blended learning terhadap keterampilan berpikir kritis peserta didik kelas xi di sman 2 Mataram," *J. Ilm. Profesi Pendidik.*, vol. 7, no. 2b, pp. 686–692, 2022.

[18] M. Rahmawati, S. Budyartati, and M. Kartikasari, "Studi literatur: Keefektifan model pembelajaran problem based learning (pbl) sebagai upaya membangun keterampilan higher order thinking skills (hots) siswa sd," *Pros. Konf. Ilm. Dasar*, vol. 4, pp. 1050–1061, 2023.

[19] M. Paat, Y. B. Mokalu, E. C. Wowor, W. A. Tumewu, and R. Arundaa, "Implementasi multimedia-pembelajaran ipa biologi model pbl untuk meningkatkan hasil belajar siswa," *SOSCIED*, vol. 6, no. 1, pp. 280–287, 2023.

[20] L. Badriyah, A. R. As'Ari, and H. Susanto, "Analisis kesalahan dan scaffolding siswa berkemampuan rendah dalam menyelesaikan operasi tambah dan kurang bilangan bulat," *J. Pendidik. Teor. Penelitian, dan Pengemb.*, vol. 2, no. 1, pp. 50–57, 2017.

[21] N. Ubaidah, Z. Zaenuri, I. Junaedi, S. Sugiman, and W. Wardono, "Aktualisasi mathematical literacy berbasis e-scaffolding di era digital," in *Prosiding Seminar Nasional Pascasarjana (PROSNAMPAS)*, 2022, vol. 5, no. 1, pp. 776–781.

[22] S. Wahyuni, E. Rahmadhani, and A. Azis, "Model pembelajaran scaffolding terhadap kemampuan pemahaman matematis siswa," *Jump. J. Educ. Multidiscip. Res.*, vol. 1, no. 1, pp. 47–59, 2022.

[23] C. Wulandari and D. Efendi, "Pengaruh profitabilitas terhadap nilai perusahaan dengan corporate social responsibility sebagai variabel moderasi," *J. Ilmu Dan Ris. Akunt.*, vol. 11, no. 6, pp. 1–15, 2022.

[24] M. Maidiana, "Penelitian survey," *ALACRITY J. Educ.*, vol. 1, no. 2, pp. 20–29, 2021, doi: 10.52121/alacrity.v1i2.23.

[25] D. D. Unaradjan, *Metode penelitian kuantitatif*. Jakarta: Penerbit Unika Atma Jaya, 2019.

[26] I. Lenaini, "Teknik pengambilan sampel purposive dan snowball sampling," *Hist. J. Kajian, Penelit. dan Pengemb. Pendidik. Sej.*, vol. 6, no. 1, pp. 33–39, 2021.

[27] M. Agustina, *Efektivitas Penerapan Model Problem Based Learning (PBL) Dengan Teknik Scaffolding terhadap hasil belajar matematika peserta didik kelas VIII SMP Negeri 1 Bandar Lampung Ditinjau dari motivasi belajar*. Lampung, 2017.

[28] A. Sholikhah, "Statistik Deskriptif Dalam Penelitian Kualitatif," *KOMUNIKA J. Dakwah dan Komun.*, vol. 10, no. 2, pp. 342–362, 2016, doi: 10.24090/komunika.v10i2.953.

[29] H. Hotimah, "Penerapan metode pembelajaran problem based learning dalam meningkatkan kemampuan bercerita pada siswa sekolah dasar," *J. Edukasi*, vol. 7, no. 2, pp. 5–11, 2020.

[30] A. E. Cahyanti, "Pengembangan perangkat pembelajaran matematika dengan pendekatan problem based learning untuk meningkatkan kemampuan higher order thinking," in *Seminar Nasional Matematika Dan Pendidikan Matematika Uny*, 2015, pp. 83–92.

[31] T. P. Astuti, "Model problem based learning dengan mind mapping dalam pembelajaran IPA abad 21," *Proceeding Biol. Educ.*, vol. 3, no. 1, pp. 64–73, 2019.

[32] M. G. Jatisunda and D. S. Nahdi, "Kemampuan pemecahan masalah matematis melalui pembelajaran berbasis masalah dengan scaffolding," *J. Elem.*, vol. 6, no. 2, pp. 228–243, 2020.