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Use of Problem-Based Learning Strategies in Improving Problem Solving Skills

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***Abstract*— Education for a child is very important for motor development and his thinking becomes critical in responding to an incident. His skills can be honed properly and master skills that support his future career. So that the potential for the progress of each child can be achieved and learning objectives can be completed optimally. In life, of course, you will not be separated from various kinds of problems, so the solution to every problem must exist and be able to solve it. The problem based learning strategy is the answer to improve problem solving skills. This strategy is a problem-triggered learning model, which encourages students to learn and work cooperatively in groups to find solutions, think critically and analytically, be able to determine and use appropriate learning resources. For this reason, it is necessary to apply this method in education. The purpose of this research was to improve problem solving skills using the problem based learning (PBL) method. By maximizing this method many positive impacts will be obtained. The method used in this research is a quantitative method. The data obtained is through the distribution of a questionnaire. The questionnaire was made using the Google form application. The results of this study explain that the use of problem based learning strategies to improve problem solving skills in education can help students solve problems with the right solutions. As well as sharpening the ability to think critically and systematically, so that they can be more mature in responding to various problems. The conclusion of this study is that the use of problem-based learning strategies to improve problem-solving skills by students can be maximized, because they have mastered the right and effective way to solve a problem. The limitation of this research is that researchers only conduct this research at the school level where the method requires new strategies in learning such as the use of problem based learning strategies.**

***Keywords*— Improving, Strategy, Solving Skills**

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I. INTRODUCTION

Education is an inseparable part of the effort to create human resources of quality and integrity with awareness as creatures endowed with reason. (Yayan Alpian et al., 2019). Therefore, education must be continuously fostered and developed so that human quality can grow and develop in accordance with the changing demands of the times, competitive and increasingly tough competitiveness. (Budiman et al., 2022). Only a quality education can answer the various demands, face competition and adapt to the environment, both national and global. (Irsan et al., 2022). The quantity of humans that continues to grow must of course be balanced with the quality of each person to become a person who has high value, so that the advancement of a civilization. (Dito & Pujiastuti, 2021). Not only that, the various problems faced will be able to be solved with a variety of different perspectives. So that critical, creative and innovative thinking skills can be developed.

The communication and information revolution is one of the factors that contributed to the birth of a new civilization, new culture, new paradigm, and so on. (Komalasari, 2020). Technology that is growing rapidly has a major positive impact on various fields of community life, one of which is in the field of education. (El Iq Bali, 2019). The manifestation of this sophisticated technology can realize learning objectives with good quality. (Astuti & Pratama, 2023). A learning method that has been introduced by many education experts and is widely spread in various social media (Servant-Miklos et al., 2019). How to get information is also getting easier (Setyarini, 2019). No need to use classic media, such as reading books or newspapers to gain knowledge (Mustafiyanti et al., 2023). With just the internet and a tap of the finger, the information you need will appear. Even from other parts of the world that are quite far away (Liam et al., 2023). Communication is so easy by using an android phone. Surfing in cyberspace is also very easy with interesting features. (Guo et al., 2020), so that many earn money quite easily and flexibly.

The classical learning model, which sees learners as objects in the perspective of the new society, is no longer effectively used because it is considered outdated. (Saskia et al., 2023). Of course, it is also not effective and efficient for learning outcomes. Now society tends to see humans as a single and equal entity, not dichotomized and upholds democratic values and eliminates the barriers of religion, ethnicity and race. (Siregar & Aghni, 2021). Even further than that, society sees teachers and students as an inseparable unit, equally important in their status and role. (Putri et al., 2023). Teachers provide knowledge with strategies that suit students' needs (Mustafiyanti et al., 2023). Then students can receive teacher teaching that is easy to understand and understand to accept and then realize it in solving the problems they face. (Choli, 2020). So that the problems faced can be minimized if you really use media and strategies according to the needs of each student. (Sinurat et al., 2021). Because in fact they have diverse characteristics in classroom learning. Coming from different cultures and family backgrounds, their paradigms also vary.

A society that is changing and growing amidst similarities is what gives rise to the birth of progressive, creative and innovative thoughts. (Salsabila et al., 2020). This includes learning approaches and models with integrity. In the past, it was known as education that focused on the delivery of material by the teacher and students simply listened without being active in the classroom. (Handayani & Koeswanti, 2021). So now on the contrary, students are required to be active and respond to the delivery of material by the teacher. (Paradina et al., 2019). In fact, they must be able to think critically about the problems they face. Good cooperation in groups, mutual respect, respect for differences, tolerance for differences, and so on. (Hasanah et al., 2021). All of these are also instilled in school education to students, known as character education. (Wahyudiati, 2022). So the

teacher's job is not only to teach, but also to educate in order to become a young generation with character, intelligence and integrity to the values of Pancasila.

One of the learning models that is currently in vogue and has received attention from educators is the problem-based learning (PBL) model.(Fidan & Tuncel, 2019). This learning model is considered relevant to the demands of a society that is changing for the better. (Sousa & Rocha, 2019). Become an innovative and creative society in the era of inevitable digital advancement (Suryawati et al., 2020). Instead, it must be followed to avoid being left behind and isolated. (Siddiqui & Malik, 2019). It is called creative because it can develop and advance according to conditions and situations that are full of challenges. (Belda-Medina, 2021). Demanded to be competitive and qualified for the development of globalization technology throughout the world (Ramadhani et al., 2019). The problems given in this learning model are actual and real problems in the environment. (Tunggyshbay et al., 2023). So students are given the opportunity to solve problems effectively and are qualified with the skills they must master first. However, the problem must be in accordance with the applicable curriculum, so that the objectives of learning are well achieved. (Djou et al., 2022). Various problems will certainly appear on their own without having to be deliberate. With the readiness of students to solve existing problems, they will be able to find the right solution, so that the problem can be resolved.

Problem-based learning is also known as innovative learning because it is considered new and different from the previous conservative learning model. (Tanti et al., 2021). As is known, learning that uses conventional methods always assumes that the learner does not have anything, like a bottle that has not been filled. So the teacher must pour various kinds of water so that students can drink it. (Rahmawati et al., 2021). That's why conventional education only makes students as mere subjects. Whereas students are able to master a science by themselves and are more creative towards the development of this era. With this learning model, it changes the assumption of students as subjects who can only accept, without rejecting that this does not suit them. Therefore, problem-based learning is the right and accurate learning to replace conventional-based learning.

According to (Setiani et al., 2020), stated in his research entitled Improving mathematical problem solving using problem-based learning strategies assisted by mind mapping, that this study aims to determine the use of problem-based learning strategies assisted by mind mapping can improve mathematical solution skills efficiently and effectively. According to (Dede Anggiana, 2019), stated in his research entitled the implementation of the problem-based learning (PLB) model to improve students' mathematical problem solving skills, that this study aims to determine the improvement of students' problem solving skills by using the problem-based learning (PLB) learning model compared to students who use conventional learning models. Furthermore, according to (Meilasari et al., 2020), stated in his research entitled the study of problem-based learning models (PLB) in school learning. It aims to analyze the application of the problem-based learning model in learning in schools so that the results of learning are achieved. According to (Firdaus et al., 2021), stated in his research entitled problem based learning (PLB) to improve students' mathematical skills, this research aims to improve literature studies related to the use of problem based learning models in improving mathematical literacy skills.

Researchers seek to maximize the use of problem-based learning strategies in improving problem solving skills. So that it can be resolved easily and efficiently against the problems that occur. The purpose of this research is to improve students' problem solving skills. The use of this strategy certainly has a big impact on students' ability to respond and solve problems that occur to them. Readiness to welcome challenges that continue to increase every day can be conquered

easily. Support from parents and cooperation with teachers will widen the possibility of realizing a qualified education. The next generation of the nation will be creative and innovative in finding solutions to the problems they experience. So that a glorious civilization will be realized with quality human resources and high integrity values that are respected.

II. RESEARCH METHODS

This study uses a quantitative method that is used for the use of problem-based learning strategies to improve problem solving skills by students. (Fuadiah, 2022). The quantitative method is a systematic scientific study of parts and phenomena and their causal relationships. The purpose of quantitative research is to develop and use mathematical models, theories or hypotheses related to a phenomenon. (Sari et al., 2022). This method uses a lot of numbers on the data obtained accurately. Starting from the data collection process to its interpretation. Meanwhile, the research method is an in-depth and careful study of all facts. Research with this method is carried out systematically, planned, and structured. Quantitative methods are defined as part of a series of systematic investigations of phenomena by collecting data which is then measured by mathematical or computational statistical techniques. (Suci Lestari & Sujana, 2021). The characteristics of quantitative methods include: using deductive thinking patterns that seek to understand a phenomenon by using general concepts to explain specific phenomena, the logic used is positivistic logic and avoids subjective matters. The research process follows a planned procedure, and data collection is done through measurement using objective and standardized tools.

Quantitative research is an approach that presents positivism. Related to numbers that are analyzed through statistics. The data collection method uses population and sample. Population is the whole, totality or generalization of units, individuals, objects or subjects that have certain quantities and characteristics to be studied, which can be people, objects, institutions, events and others that can provide research information from which conclusions can be drawn. The population can be made with two, namely the target population which is a population that has been determined in accordance with research problems, and the research results from the population want to be concluded. While the survey population is the population covered in the research being conducted. The population consists of elements taken as samples. The sample is a small part of the population members taken according to certain procedures so that it can represent the population.

III. RESULT DISCUSION

The use of problem-based learning strategies to improve problem solving skills by students to the maximum and realize successful learning goals. Quantitative methods are part of a systematic systematic investigation of phenomena by collecting data to be measured by mathematical or computational statistical techniques. The quantitative data collection process is known as questionnaire, interview and observation data collection techniques. Research in the form of numerical and countable numbers is also called quantitative research. Quantitative research is obtained through a questionnaire as a research tool or can use a questionnaire. Research is obtaining facts or principles by collecting and analyzing data that is carried out clearly, thoroughly, systematically and can be accounted for. Research is defined as a researcher's effort to test the data obtained and produce new knowledge. Therefore, research is the spearhead in the development of science. The data obtained is accurate and real and not made up. The characteristics of research are scientific and sustainable. Research is said to be scientific because it is carried out through systematic procedures and objective fact-finding. Meanwhile, in terms of sustainability, research is an ongoing process. The results of a study will continue to be refined along with the development of science.

This quantitative research method is a systematic scientific research on parts and phenomena of causal relationships to develop and use mathematical models, theories and hypotheses related to events or phenomena. The advantage of this quantitative data analysis is that the data can be interpreted with accurate data analysis. Based on mathematical principles, so the quantitative approach is seen as objective and rational. Data collection techniques can be through interviews, questionnaires and observations. This quantitative research helps in determining the relationship between variables in a population and sample. It also helps determine the research design. Talking about quantitative research design, it has two forms, namely descriptive studies and experimental studies. This quantitative research presents data on the use of problem-based learning strategies to improve problem-solving skills in order to answer solutions appropriately and efficiently. The following are the results of distributing questionnaires and statements about the effectiveness of using this strategy.

Statement	Strongly Agree	Agree	Disagree	Strongly Disagree
The use of problem-based learning strategies to improve problem solving skills by students can run effectively.	50%	45%	3%	0%
The existence of a problem-based learning strategy makes it easier for teachers to determine the right way of learning.	60%	50%	0%	0%
This strategy can be combined with other learning strategies so that learning objectives are achieved.	55%	35%	5%	3%
This strategy is indispensable in the world of education which requires continuous development.	75%	45%	10%	0%
Motivated students in doing the learning taught by the teacher	60%	50%	0%	0%
Students are moved to find out creative and innovative knowledge to support competition between generations	50%	50%	4%	3%
The use of this strategy if appropriate and	40%	55%	2%	0%

accurate will advance all aspects of education				
Problem solving becomes easier with the utilization of problem based learning strategy	70%	40%	0%	0%
The problem level of students who are less interested in learning is decreasing	60%	30%	3%	1%
Ease will be obtained if optimizing the use of this strategy by educators	65%	45%	0%	0%
Accommodation for students who need problem solving solutions is fulfilled	55%	45%	0%	0%
Learning objectives can be achieved by maximizing this strategy well	65%	35%	3%	0%
Students' skills in critical thinking and understanding related to various problems can be resolved	70%	50%	0%	0%
Learning is more fun and conducive when using this strategy	30%	75%	0%	0%
Complicated problems are solved efficiently when using this problem-solving strategy.	55%	70%	2%	0%

The statement that the problem-based learning strategy makes it easier for teachers to determine the right way of learning, obtained a percentage of 60% in the strongly agree category. While in the agree category, the percentage was 50%, for the disagree category, the percentage was 0% and so did the strongly disagree category, which got the same percentage of 0%. The statement that this strategy can be combined with other learning strategies so that the learning objectives are maximized received a percentage of 55% in the strongly agree category. Whereas in the agree category, it got a percentage of 35%, for the disagree category it got a percentage of 5% and in the strongly disagree category it got a percentage of 3%. Furthermore, the statement stating that this strategy is indispensable in the world of education which requires continuous development, obtained a percentage of 75% in the strongly agree category.

Meanwhile, for the agree category, the percentage is 45%, for the disagree category, it gets a percentage of 10% and finally in the strongly disagree category, it gets a percentage of 75% in the strongly agree category. by 0%. In the statement of motivated students in doing the learning taught by the teacher, it got a percentage of 60% in the strongly agree category. Meanwhile, in the agree category, it got a percentage of 50%, for the disagree category, it got a percentage of 0% and in the strongly disagree category, it got a percentage of 0%.

Furthermore, the statement stating that students are moved to seek creative and innovative knowledge to support the increasingly tough competition in the future, obtained a percentage of 50% in the strongly agree category. While in the agree category, the percentage was 50% as well, for the disagree category, the percentage was 4% and finally in the strongly disagree category, the percentage was 3%. The statement stating that the use of this strategy, if appropriate, will advance all aspects of education, obtained a percentage of 40% in the strongly agree category. Meanwhile, the agree category obtained a percentage of 55%, The disagree category received a percentage of 2% and the strongly disagree category received a percentage of 0%. Furthermore, the statement that problem solving becomes easier with the good utilization of problem-based learning obtained a percentage of 70% in the strongly agree category. Whereas in the agree category, it obtained a percentage of 40%, for the disagree category obtained a percentage of 0%, and the strongly disagree category obtained a percentage of 0%.

The statement that states on the ease will be obtained if optimizing the use of this strategy by educators gets a percentage of 65%. Whereas in the agree category, it got a percentage of 45%, for the disagree category, it got a percentage of 0% and for a percentage of 0% also in the strongly disagree category. Furthermore, the statement that accommodation for students who requires problem solving solutions to be maximally fulfilled, obtained a percentage of 55% in the strongly agree category. While for the agree category, the percentage was 45%, for the disagree category, the percentage was 0%, as well as a percentage of 0% in the strongly disagree category. The statement that learning objectives can be achieved by maximizing problem-based learning strategies, obtained a percentage of 65% in the strongly agree category with the statement given. Whereas in the agree statement, it obtained a percentage of 35%, for the disagree category obtained a percentage of 3% and for the strongly disagree category obtained a percentage of 0%. This proves the abundant benefits for many people.

Furthermore, the statement of students' proficiency in critical thinking and understanding related to various problems can be resolved obtained a percentage of 70% in the strongly agree category. As for the agree category, it obtained a percentage of 50%, for the disagree statement obtained a percentage of 0%, as well as the strongly disagree category obtained a percentage of 0%. The statement that learning is more fun and conducive when using this strategy, obtained a percentage of 30% in the strongly agree category. Whereas in the agree category, it obtained a percentage of 75%, for a percentage of 0% in the disagree category and also strongly disagree obtained a percentage of 0%. Finally, the statement stating that complicated problems will be resolved efficiently if you use this problem-solving strategy, obtained a percentage of 55% in the strongly agree category. Meanwhile, for the agree category, the percentage is 70%, for the disagree category, the percentage is 2% and for the strongly disagree category, the percentage is 0%.

percentage of 0%. All of these statements show the results that there is indeed a great need for problem-based learning strategies to improve diverse problem-solving skills in life.

The characteristics of this PBL strategy are the submission of questions or problems related to everyday life, focusing on interdisciplinary problem solving with effective solutions used, authentic investigation which means it is done in an original

and realistic way, producing products or works and presenting them and working together to achieve common goals. Meanwhile, according to Rusman, the characteristics of this problem-based learning model are that problems become starting points in learning, the problems raised are problems that exist in the real world that are not structured, problems require multiple perspectives, problems challenge students' knowledge, attitudes, and competition which then require identification of learning needs and new areas of learning. Self-directed learning becomes the main thing, utilization of diverse knowledge sources, their use, and evaluation of information sources are essential processes in problem-based learning.

Learning how to cooperate with colleagues in solving problems, developing inquiry and problem-solving skills are as important as mastering the content knowledge to find a solution to a problem. Synthesis and integration of a learning process and the involvement of evaluation and review of student experiences and learning processes.

The results of this study indicate that the use of problem-based learning strategies to improve students' problem solving skills can be well resolved in the search for problem solutions. The optimal use of this strategy has a large and flexible positive impact on learning objectives. A learning strategy is a plan of strategies or methods that teachers use to address and meet the needs of each student for independent and educated problem solving. These learning strategies are developed in advance by the learner before being implemented in the classroom when teaching. The real benefit that has been proven in this research is that it is effective in solving problems that occur, because with this problem-based learning strategy, students are required to think critically to develop soft skills.

The problem-based learning strategy can be used to develop students' hard skills in dealing with various problems that occur around them. An example of this problem-based learning strategy is a teacher who continues to encourage students to actively ask questions in class and give awards for the weighty questions they ask. As well as encouraging students to look for solutions or solutions to real problems formulated by students themselves, it is hoped that students can learn to handle the tasks of finding solutions independently in later life. The steps of this learning model include applying several concepts, namely basic concepts. This is so that students quickly enter the learning atmosphere and get an accurate map of the direction and purpose of learning. The next step is independent problem coefficient which can be in the form of articles, web pages or experts in relevant fields.

The research studied on the use of problem-based learning strategies to improve problem solving skills went well and got maximum results. Evidenced by several statements distributed through a questionnaire, then the researcher presents them through a table so that it is easy for the reader to read and understand.

The method used in this research is a quantitative method that uses numbers or numerics that contain numbers in it that are accurate and reliable. This research method is obtained by collecting all the many data obtained by researchers by going directly to the research location, namely at school. When directly at the research site, the researcher tries to explore his research to get valid data. By using this quantitative method which contains accurate original data, researchers can explain in detail how much data has been researched in the field correctly and according to the actual facts that exist. This method also makes it easier for researchers to make scientific papers using tables containing statements about the effectiveness of using this PBL learning strategy. The results obtained from this statement are also explained through the explanation after the use of the table, so that it can be seen easily by the reader.

The purpose of this study is to facilitate teachers and students in the teaching and learning process. Most schools have implemented this learning strategy and proven to be effective. But there are also those who have not implemented it,

still using boring classic learning methods. In this sophisticated era, it is unfortunate if it does not make good use of technological sophistication to support the success of learning in schools. It can also solve problems accurately and students are proficient in using this problem-based learning strategy. Their abilities are also honed for the better. Appropriate and optimal use gives birth to a smart generation with creative, innovative, and critical thinking in facing all obstacles of life.

IV. Conclusions

Based on the discussion of the research above, it can be concluded that the use of problem-based learning strategies to improve students' problem solving skills goes well if optimally and maximally using this strategy. If it is supported by creativity and intelligence in applying it, and cooperation between teachers and parents needs to be applied. So that the desired learning objectives are achieved properly. So that many parties will get a positive impact from the results of using this problem solving strategy. Because the problem will definitely take turns and the level of the problem is different according to the times as well. This strategy creates convenience for teachers to teach how to train students to be critical in responding to their life problems. They are trained properly and in accordance with existing procedures. The results of this study that examined elementary school students were a table of statements strongly agree, agree, disagree and strongly disagree about the use of this PBL strategy for problem solving. So the result is that it is proven effective this learning model is applied for the education of students to be critical, creative and innovative in accepting life problems.

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Previously, I would like to thank you for helping me to complete the research entitled the use of problem-based learning strategies to improve problem-solving skills well and easily. After I researched this research I became aware of the effectiveness of PBL strategies in solving problems and understood the importance of applying this method. I hope that future researchers can continue this research even better.

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