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The Influence of Problem-Solving Learning Model Assisted by Adventure Board Media on Students' Problem-Solving Ability

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A B S T R A C T

Problem-solving is one of the abilities that must be mastered by elementary school students, especially regarding learning to count. So the authors applied the problem-solving learning model using adventure board media to determine the effectiveness in dealing with this problem-solving ability. This research uses quantitative methods. This type of research is an experiment with a none-none equivalent control group design. The population in this study were students in class VA and VB Ungaran Elementary School 01. Data analysis techniques used the normality test, homogeneity test, and simple linear regression test. The results showed that there was an effect of the problem-solving learning model on students' problem-solving abilities using adventure board media on increasing students' problem-solving abilities as evidenced by t count = 4,864 > t table = 2,064 and a significance value of 0.000 <0.05 and influencing the problem-solving ability variable by 47.5%. So it can be concluded that the problem-solving learning model using adventure board media can affect students' problem-solving abilities

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INTRODUCTION

The definition of each education expressed by each individual is very diverse. However, the conclusion of the opinion regarding the definition of education is as stated in Law Number 20 of 2003 which states that "Education is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential to have religious spiritual strength, control personality, intelligence, noble character, and the skills needed by himself, society, nation, and state. Still, in the same law, it is also stated that there are three places where education takes place, namely family, community, and school. From this statement, we can see that schools are the third place to get an education. Therefore, school is not the main place for an individual to obtain an education, especially to form the character of the individual himself.

However, it does not mean that education is a less important thing to prioritize. Precisely in life becomes one of the main parts of achieving the goals of the development of a nation. Because with human education can change and determine the direction of his life will be where and what kind. Likewise with the achievement of development in a country that is not separated from its human resources. With quality human resources, the development of a country is no doubt. As the vision and mission contained in the National Education System of the Republic of Indonesia Law No. 20 of 2003 states "The realization of the education system as a strong and authoritative social institution to empower all Indonesian citizens to develop into qualified human beings so that they are able and proactive in answering the challenges of an ever-changing era". (Mustadi, 2020)

In addition, through education, people become more developed and advanced in a civilization and have more authority in social life. At least, people if they have morals and have *common sense* in living their daily lives. No matter where you are, you will not be separated from your social life. Consistent with this, every generation in the challenge of an education is increasingly complex, especially at the primary school level which is the initial milestone of every individual in the educational process. As contained in the excerpt of the Law on the National Education System No. 20 of 2003 Chapter II Article 3 on the basis, function, and purpose of education, stated that "National education serves to develop the ability and shape the character and civilization of a dignified nation in order to educate the life of the nation, aiming to develop the potential of students to become human beings who believe and fear God Almighty, have noble character, healthy, knowledgeable, capable, creative, independent, and become citizens who are democratic and responsible". (Anwar, 2012)

Not only that, the process of teaching and learning activities between teachers and students is also very influential on each other. When the activities are in process two aspects must be considered, among others, are the material and characteristics of students. Because it coordinates and organizes learning situations around a student's environment, it can help students grow and be

motivated to undertake learning activities to achieve their goals, especially in mathematics. (Isrok'atun & Rosmala, 2018)

Nasution (Subarinah, 2006: 1) expresses the word mathematics related to Sanskrit, namely "media" or "vidya" which means intelligence, discovery, and intelligence. The definition of mathematics is also presented by experts. According to Ruseffendi (1991:261), mathematics is the science of organized structures ranging from undefined elements to defined elements, to axioms or postulates, and finally to postulates. Opinions from Johnson and Rising are quoted from Ruseffendi (Suwangsih and Tiurlina, 2010; Subarinah, 20 reveal that mathematics is a language that "Define carefully, clearly, and accurately its representation using symbols. In addition, Kline (Suwangsih and Tiurlina, 2010; Subarinah, 2006) argues that mathematics is not a separate knowledge that can be perfect because of itself, but the existence of mathematics is to help humans in master social, economic, and natural problems. According to some of these definitions, the term "mathematics" can be understood to refer to the science of developing concepts by examining ways of thinking that are logical and reasonable. Because its existence can be learned from a variety of phenomena, therefore mathematics is called a science. (Isrok'atun & Rosmala, 2018)

However, students tend to hate and even fear math lessons. This statement is true because mathematics is in many cases seen as a science that underlines the ability to think normally with hard and tried and true principles. Although mathematics is taught at all levels of training and is a component of a person's measure of success in achieving a certain level of education. As a result of these circumstances, mathematics is not only used for career support but also as a reference for further education. In addition, competition also never stops at an aspect, even requiring each individual to be able to continuously produce new concepts in an approach that requires being able to always bring up new ideas in alternative solutions to a problem faced. (Wartini et al., 2018)

Problem-solving is one of the main corners of an arithmetic education plan that expects students to apply and coordinate various ideas and abilities, science, as well as decision making which is very important in the development of conceptual understanding (Tarzimah, Tambycik & Meerah, 2010; Kapur, 2015, UI Hassan & Jabbar, 2015). This is following the standards and principles of the National Council of Teachers of Mathematics(NCTM) aimed at achieving content standards, students must have five core skills in mathematics, namely problem-solving skills, reasoning, communication, pattern tracing or relationships, and representation (NRC, 2012; cope, 2015). Similarly, the OECD (2017) and Mellone, Verschaffel & Dooren (2017) have said that problem-solving skills are very important, not only for mathematics but to deepen skills in understanding and solving problems in real situations or everyday life. (Asfar & Nur, 2018)

At Ungaran 01 Public Elementary School, preliminary studies and observations of students' problem-solving skills revealed that some students still have difficulties in solving problems, among some students who can answer problem-solving problems, there are still students who lack in understanding problem-solving concepts. So that students experience doubts

and even difficulties when faced with problems regarding problem-solving. Even students who understand the concept of problem-solving don't fully understand it. So there are still some students who do not write any answers in the answer column, or who do not have any plan to solve the problem in any way even do not get any answers that can be expressed in the available answer column. Because students' problem-solving abilities are related to their comprehension abilities. Based on the previous analysis, the average score obtained from the observations of grade V students of SDN Ungaran 01 about problem-solving abilities is as follows:

Table 1. Average Grade Point Average of Students' Problem-Solving Skills

Class	Average
VA	69.89
VB	54.67

From the above problem-solving ability scores that are still not in line with expectations, it can be seen that students in the class are still weak in problem-solving skills. Because the results show that students who get a grade on the mathematics subject are not complete or do not meet the minimum completion requirement or KKM, which is 75. This shows that students still do not understand problem-solving. The average results of the VA class were 69.89 and the VB class obtained an average of 54.28, then the author can determine the VA class as a control class because the average is higher and the VB class as an experimental class because it obtained a lower average value than VA class. In dealing with problems, students are expected to understand the problem-solving process by being able to choose and recognize the prevailing situations and principles, seek speculation, know the activities to be carried out to overcome them and be skilled in choosing what is obtained in the problem and how the problem is solved (Sarmiento, Alfonso and Conde, 2017). As shown by Polya (1988), the answer to problem-solving includes 4 steps in solving, namely: (1) understanding the problem (see); (2) preparing or planning a problem-solving solution (plan); (3) implementing a problem-solving plan (do); and (4) evaluating by re-examining the solution that has been obtained (check). (Florida Department of Education, 2010; Ersoy, 2016) (Asfar & Nur, 2018). The results of the percentage of students learning from the above analysis of problem-solving indicators are as follows:

Table 2. Percentage of Indicators of Student Problem-Solving Results

Class	Indicator				Average
	Understanding tag issues	Planning a problem	Implement troubleshooting	Double-checking	
VA	80.35%	68.57%	66.85%	64.14%	69.9%
VB	55.85%	52.85%	57.71%	52.71%	54.7%

Judging from the percentage of the table above, the average grade in the VA class is **69.9%** and the VB class is **54.7%.** From the description that has been prepared by the researcher, it tends to be that one of the causes is not the lack of problem-solving in students because learning in the classroom emphasizes

students' understanding without including the ability to think in arranging to problem-solve. Rarely are students allowed to find alternatives to what teachers teach. Students' ability to solve problems is still low as a result of the lack of teachers to encourage them to develop their understanding of the material. Students can't solve problems, so they can't think of any other way to detect or figure out what the problem is. (National Research Council, 2012). This will have an impact on students who will later have difficulty applying concepts to solve non-routine problems in the sample problem will also be faced. (Sulaeman et al., 2021)

Based on the phenomenon from the preliminary study on the analysis conducted at Ungaran Elementary School 01, innovation is needed to overcome this in mathematics learning, especially in mathematics subjects. Because the right method can bring students to absorb the material and one of them is the problem-solving method (Problem-Solving). A method to help students solve problems is called problem-solving. The act of solving a problem and its outcome (the solution) are two sides of the same definition in terms of problem-solving. It is expected that when faced with a challenge, students will be able to apply their problem-solving abilities to come up with solutions, expanding the scope of their thinking (Areana, 2012). (Djamarah & Zain, 2010) reinforced this statement by stating that the problem-solving learning method provides opportunities for students to solve problems independently to obtain a solution concept so that they are then able to apply the concept to various problems.

From the observations that have been made, teachers at Ungaran Elementary School 01 have applied the learning model of problem-solving, especially in mathematics subjects. This problem-solving learning model is often applied by teachers to students so that students can solve problems with problems faced by students such as in discussion activities where students are given practice questions related to problem-solving, especially in materials related to problem-solving abilities. Here some students still find it difficult if faced with non-routine problems to understand it so that it triggers students' questions in solving problems.

Based on observations, the student's textbook does not contain all the materials and questions used to support the problem-based learning model. While learning activities more often use materials or teaching media provided by schools. Although the media used follows the material to the core competencies and basic competencies that have been determined, the use of media has not fully influenced students in solving the problems presented by teachers. This happens because the use of models and media is still monotonous so it has not reached the maximum meaningful learning goals. Though students need to understand the concepts of problem-solving to be able to plan and solve non-routine problems faced. (Shilphy, 2020)

Problem-solving strategies or problem-solving techniques are not just teaching strategies, but techniques for thinking in reasoning. Because students use problem-solving methods to try to learn to think by finding problems, finding solutions to problems, applying solution planning, and making conclusions. While students should be taught to think creatively, this is not an

easy matter. Individually or in groups, problem-solving skills can be taught to foster creative thinking in students (Utami et al., 2017). According to Polya (1973), the syntax of a common problem-solving learning model is to understand the problem, plan the solution, execute the plan, and check back. (Erika et al., 2021)

These steps should be ingrained into each student so that in the experience that will continue to grow they will be accustomed to using problem-solving strategies, students will understand the importance of critical thinking in any problem they face. In addition to the steps above to overcome the ability to solve mathematical problems in students of Ungaran Elementary School 01, an innovative and creative device is needed to support the level of ability to solve mathematical problems in students. Because with the help of real media or concrete media such as adventure boards, it is expected to facilitate students in understanding and improving problem skills (Lokawati, 2006). The learning model of problem-solving using the adventure board media that will later be used in this study will be presented following the state of the environment so that students' curiosity arises. This curiosity will encourage the individual to find a concept of the material presented from his thoughts. From there the problem-solving method in students is expected to facilitate students in understanding and strengthening solutions to their problem-solving abilities (Utami et al., 2017). By using scale and floor plan material made with adventure board media, this study aims to determine the effect of students' problem-solving abilities with problem-solving learning models.

THEORETICAL REVIEW

The following is a theoretical review regarding the stages of research on the influence of the problem-solving learning model assisted by adventure board media on students' problem-solving abilities:

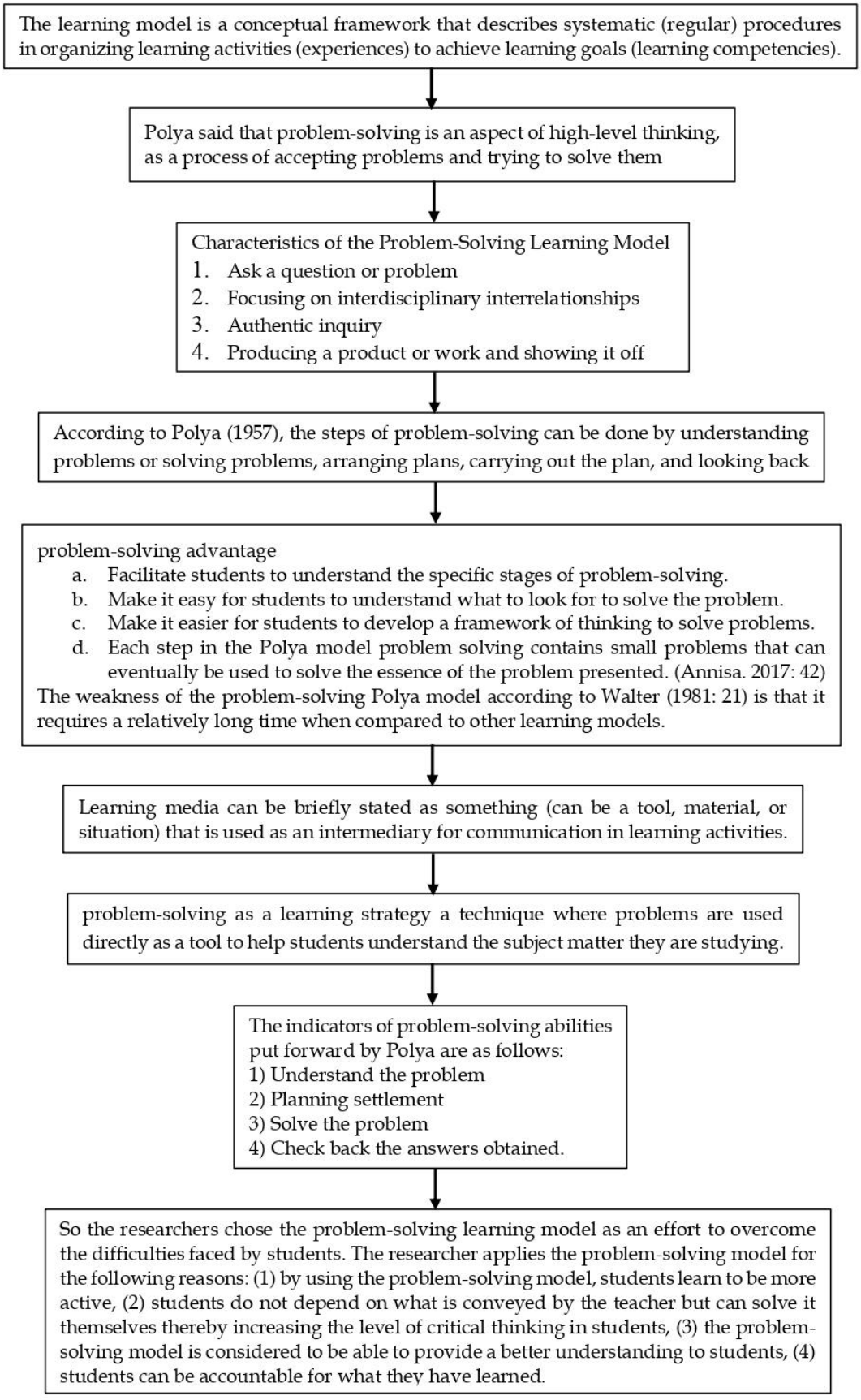

Figure 1. Theoretical Review

METHODOLOGY

One of the research techniques used in this study is the quantitative research method, which is a research strategy to test certain hypotheses by examining the relationships between variables. The population in this study consisted of students in class VA and VB SDN Ungaran 01. Researchers chose the Purposive sampling method based on the collection of values for VA and VB classes. This study used several data collection techniques, namely tests, and non-tests (observations and questionnaires). The learning tools used in this study are a learning syllabus, a learning implementation plan, and a learning module. Before the research is carried out, the question to be used in the research is tested first to know the validity value of the question. For initial data processing with a validity test, 10 valid questions were tested. Then continued with a reliability test with a Cronbach's Alpha value of 0.904 where the test question was declared reliable because the alpha value exceeded 0.6. After the question was declared reliable, the difficulty level test was continued and the results were obtained with 4 questions in the medium category and 6 questions in the easy category. Then a different power test was conducted and there were 5 questions with very good categories and 5 questions with good categories. After the initial data processing was carried out, research was carried out by pre-testing the experimental and control classes. In the experimental class after the pre-test followed by the deepening of the material using teaching materials. On the next day, experimental group students were treated by conducting student activities according to existing procedures using adventure boards and tools that have been provided to facilitate students in understanding problem-solving. After doing the student's activity with the given exercise question, students are asked to spell out the post-test question. In the control group after doing the pre-test followed by deepening the material using teaching materials provided by the school. The next day, the control group students were still on the subject with the teaching materials provided by the school and the notes they had obtained on the scale and floor plan materials. Students are asked to complete a post-test. After the study in the control group and the experiment was carried out, data analysis was carried out using normality tests, homogeneity tests, and regression tests to determine differences, effects, and improvements in the implementation carried out. Here is a chart of the research that has been done:

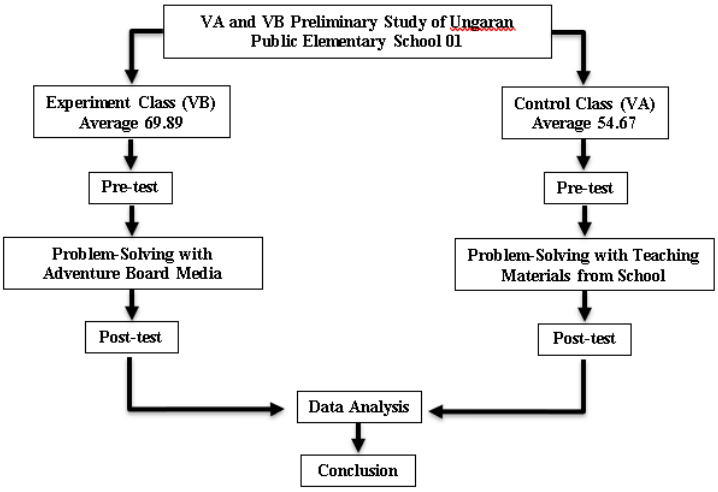

Figure 2. Stages of Research

RESULTS

To find out whether there is an influence on the problem-solving learning model using adventure board media on the problem-solving ability of research students using a simple linear regression analysis test with the SPSS version 25.0 program. The results of the simple linear regression test obtained can be seen in the table below:

Table 3. Simple Linear Regression Test

Coefficients

Model		Unstandardized Coefficients		Standardized coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	71,741	2,471		29.030	0.000
	Model PS Adventure Board	325	0.067	0.705	4.864	0.000

a. Dependent Variable: Troubleshooting Ability

Table 3 above shows that t count = 4.864 > t table = 2.064 and the significance value of 0.000 < 0.05. Thus, it can be interpreted that there is an influence in the problem-solving learning model on students' problem-solving skills using adventure board media on improving students' problem-solving skills in grade V of Ungaran Elementary School 01. The results of the simple linear regression test also showed the value of R square or R2 = 0.475, which means that the variable of the problem-solving learning model on the problem-solving ability of students using the adventure board media affects the variable of problem-solving ability by 47.5%.

DISCUSSION

Based on this study, it is known that problem-solving models using adventure board media are influential in problem-solving. This can be seen from the simple linear regression test, especially the problem-solving learning model using the adventurer board media as a dependent variable that affects students' problem-solving ability as a dependent variable. Utilization of problem-solving learning models by utilizing adventure board media makes students' problem-solving abilities more optimal so that students are easier to answer problem-based problems given in the research of Septiyan Halel Wijaya and Suhandi Astuti (2021) who concluded that the Problem-Solving model is superior to Problem-Based Learning in terms of problem-solving skills in elementary grade IV mathematics subjects.

Using adventure board media, students race to solve problems and find the best solutions and reasons using problem-solving stages in problem-solving learning models. This assertion is supported by research conducted in (August 2018) by Guntur Maulana Muhammad, Ari Septian, and Mastika Insani Sofa. Based on these findings, the researchers concluded that the increase in students' ability to solve mathematical problems through the Creative Problem-Solving learning model was superior to the increase in students' ability through the standard learning model. (Sulaeman et al., 2021)

The purpose of associating the problem-solving learning model supported by the adventure board media in this study is because it is presented following the state of the environment so that students' curiosity arises. This curiosity will encourage students' level of thinking in finding solutions to problems faced independently. From there the problem-solving method in students quite easy for students to understand and strengthen the solution of problem-solving abilities (Utami et al., 2017). This is also reinforced by research conducted by Dini Fitria Sari and Meita Fitrianawati (2020) that the mathematical adventure media (Petamatika) is considered feasible to be used on itinerant and wide-ranging flat materials for grade IV Elementary School by obtaining an average score of 86.41 out of 100 from experts, learners, and teachers. So it can be concluded that the problem-solving learning model using adventure board media is influential in improving students' problem-solving skills. (Sari & Fitrianawati, 2018).

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

Problem-solving learning model activities on students' problem-solving skills by utilizing adventure board media have been proven to improve students' problem-solving skills in grade V of Ungaran Elementary School 01. This can be seen from the results of the analysis of the normality test in pre-test sig 0.074 > 0.05 and post-test sig 0.124 > 0.05 which means that the data is normally distributed. Then in the homogeneity test for pre-test GIS 0,500 > 0.05 and post-test GIS 0.533 > 0.05, the data obtained was homogeneous. In the regression test t count = 4.864 > t table = 2.064 and significance value 0.000 < 0.05. Thus, the variables of the problem-solving learning model related to

students' problem-solving ability using experience board media were known to affect the variables of students' problem-solving ability by 47.5%.

Recommendations

Some suggestions that researchers can convey to related parties are: (1) teachers are advised to use problem-solving learning models based on adventure board media to improve students' problem-solving skills, (2) students are encouraged to be more active and bold in expressing opinions and expressing creative ideas to solve a problem, so that it is necessary to increase the use of more varied and challenging learning methods, (3) this activity provides significant benefits so that it is expected that teachers and students can apply it continuously.

FURTHER STUDY

The media in this research requires a lot of innovation and instruments in its application. For teachers, it is recommended to use problem-solving learning models based on adventure board media to improve students' problem-solving abilities. In addition, students must be more active and courageous in expressing opinions and expressing creative ideas to solve a problem, so it is necessary to increase the use of learning methods that are more varied and challenging. And to be able to research problem-solving learning models with adventure board media to the fullest, other researchers should better prepare all the instruments.

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