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Qualitative Study of Teachers' and Students' Perceptions of the Application of the Discovery Learning Model in Physics Learning in Class X Senior High School

Aditya Saputra[1*]

[1] *Department of Physics, Universitas Negeri Padang, Jl. Prof. Dr. Hamka Air Tawar Padang 25131, Indonesia*
Corresponding author. Email: saputraaditya16964@gmail.com

ABSTRACT

The aim of writing this article is to describe teachers' and students' perceptions of the application of discovery methods in the teaching process at school. This article involves a descriptive qualitative approach. The research subjects consisted of Physics Teachers and class X students at Riau State High School. Data was collected through questionnaires and online interviews by sharing questionnaire access links. The results of this research provide a good picture of the teacher regarding the Discovery Learning model and want to implement this model in the school. The students' responses also had high enthusiasm and good learning motivation even though there were still some difficulties in learning. The application of this model encourages students to be more active, independent and think critically. Thus, this learning model can be used to support the development of students' thinking skills.

Keyword : Discovery Learning, Teacher Perception, Student Perception, Physics Learning, Scientific Skills

I. INTRODUCTION

Education functions as a structured forum for students to acquire knowledge. The learning process takes place in the classroom with the teacher as a facilitator. [1]. The educational process also has a real influence on students in the form of development of knowledge, skills and attitudes. Therefore, schools can be seen as institutions for character and competency formation [2]. In a broader context, education plays a strategic role in ensuring social development and community welfare [3].

In the modern era, technology is experiencing rapid development. So, open and critical thinking is needed in facing problems [4]. This change also brings a transformation in learning from conventional methods towards a more interactive, contextual and student-centered approach [5]. By mastering science process skills, students can develop practical abilities such as carrying out scientific investigations, analyzing information, and drawing conclusions based on data obtained empirically [6].

Learning activities are processes that encourage the development of students' physical and psychological aspects [7]. For this reason, the learning process must cover the cognitive, psychomotor and affective domains [8]. One factor to improve learning is motivation, because high motivation can encourage students to achieve optimal learning achievement [9]. On the other hand, success in solving problems is also influenced by students' ability to utilize the various intelligences they possess [10]. Therefore, the learning process is designed to equip students with abilities that cover three main aspects, namely cognitive, psychomotor and affective [11].

In physics learning, which contains abstract concepts about natural phenomena, teachers are required to present real learning, such as through experiments or direct observation [12]. This approach helps students

develop science process skills that involve data collection, analysis, and drawing logical conclusions based on evidence [13]. These skills also support the mastery of conceptual understanding and its application in practice [14].

In the current century, it is necessary for students to hone high-level thinking skills [15]. Critical thinking helps students understand the material in depth and analyze problems that arise in learning [16]. Meanwhile, creative thinking plays an important role in generating new ideas as a basis for sharper critical thinking [17]. These two skills complement each other and are very relevant to develop in the educational process [9].

The Discovery Learning learning model is an effective strategy in developing students' thinking abilities [18]. In this model [19], students are trained to actively explore concepts through observation, experimentation and problem solving activities independently [16]. This model allows students to restructure their knowledge through meaningful learning experiences that are stored in long-term memory [20]. In this case, the teacher serves as a facilitator who guides students during the process of finding solutions [21] [13].

The effectiveness of Discovery Learning will be more optimal if it is combined with learning media in the form of modules. This module is designed to foster independent learning, intuitive thinking abilities, and formulating hypotheses [22]. With modules that support a discovery approach, learning can be tailored to each student's learning style, making it more efficient and effective [23]. On the other hand, discovery-based learning can improve students' systematic thinking abilities and skills [24].

Furthermore, Discovery Learning is closely related to the Problem-Based Learning (PBL) approach, which emphasizes solving real problems as the basis for learning (19). Through this approach, students gain active, independent, exploratory learning experiences at school [25].

However, the implementation of this model in the field has not gone completely well. In some areas, especially in underdeveloped areas, teachers still face difficulties in guiding students, especially at the problem formulation stage, even though this stage is very important in discovery-based learning.

Therefore, writing this article will examine teachers' perceptions of the Discovery Learning model in physics learning for class X SMA as well as students' perceptions of the learning experience using the discovery-based learning model. The hope is that by implementing this model schools can develop students who have adequate competencies and maximize their science skills.

II. METHOD

This research uses a descriptive qualitative method. Which aims to describe what teachers and students perceive the Discovery Learning model in Physics learning. This research only focuses on the views, experiences and responses of students. The subject of the article is a Physics teacher and class X high school students located in Riau. Data was collected through questionnaires distributed to students and online interviews with teachers.

III. RESULTS AND DISCUSSION

The questionnaire was distributed for 3 days and received responses from 50 students. Meanwhile, for the Physics Teacher interview, there was only 1 Physics Teacher at the high school. Where the results of student respondents can be seen in the following graph.

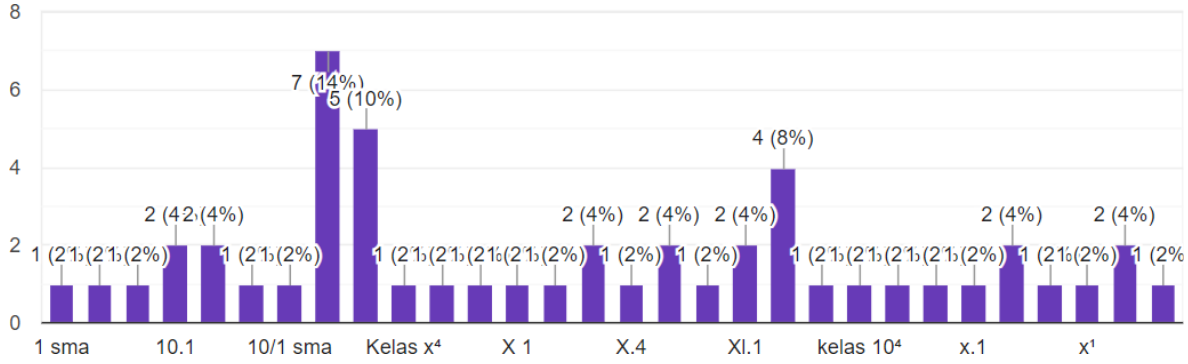


Fig. 1. Graph of Student Questionnaire Respondents

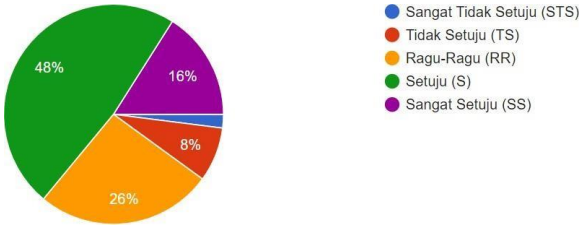
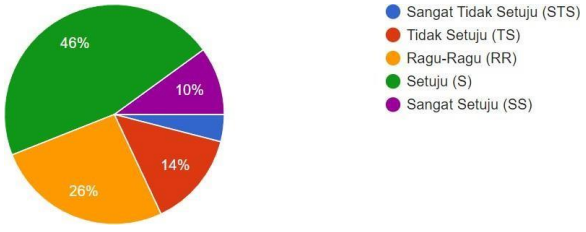
The following are some questions during the Physics Teacher interview at senior high school with 1 teacher as the respondent

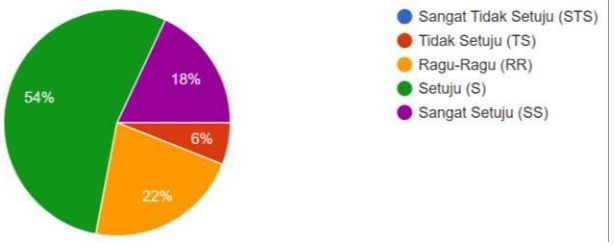
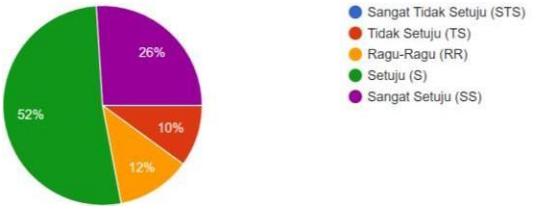
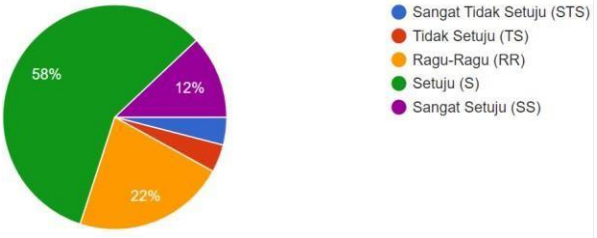
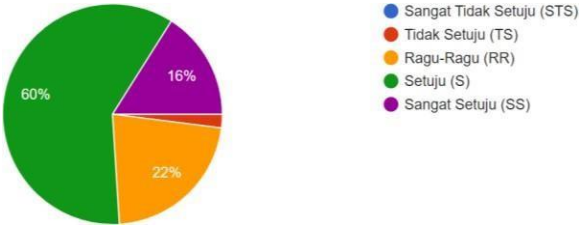
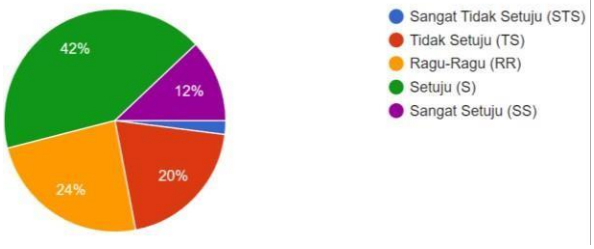
No	Question	Teacher Response
Acceptance of the Discovery Learning Model		
1.	I understand the learning steps of Discovery Learning	Yes, I quite understand the stages from stimulation to generalization
2.	I know the main purpose of the Discovery Learning model	The aim is for students to discover concepts for themselves through an active learning process
3.	I am willing to try to apply Discovery Learning in physics learning	Of course, I was interested in trying it because this model encourages student activity
4.	I am interested in using Discovery Learning as a variation of teaching method	Yes, so that learning is not monotonous and is more challenging for students
Views on Model Effectiveness		
5.	Discovery Learning helps students build concepts through hands-on experience	It's true, students understand more quickly after practice or experimentation
6.	This model is effective in increasing students' understanding of physics material	I think it's effective, especially for material that can be observed directly
7.	Discovery Learning can be applied to most topics in physics lessons	Yes, but it must be adjusted to the level of difficulty and time available
8.	Motion, electricity and fluid material is suitable to be taught using the Discovery Learning approach	Very suitable, because students can directly observe the symptoms
Attitudes towards Implementation Readiness		
9.	I have sufficient pedagogical skills to implement Discovery Learning	I feel quite capable, but still need further training
10.	I am able to design learning with the Discovery Learning stages independently	Yes, as long as there is enough time to prepare the device
11.	The allocation of time in class allows me to implement Discovery Learning steps	Sometimes limited, but can be managed if the learning plan is efficient

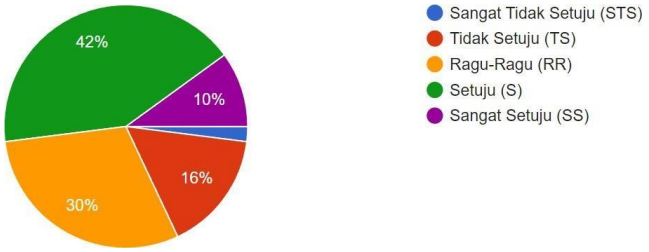
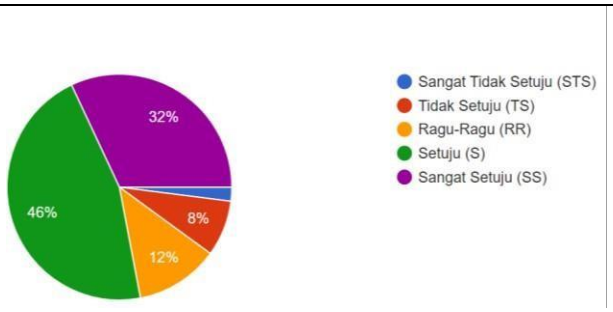
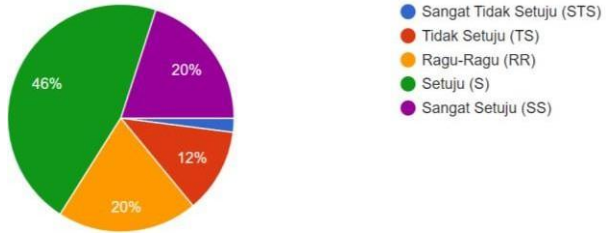
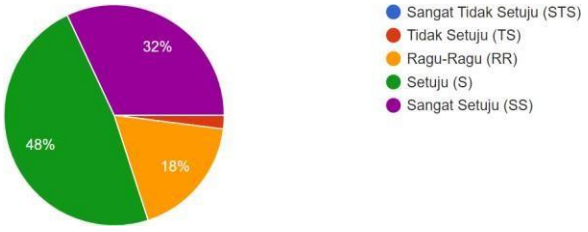
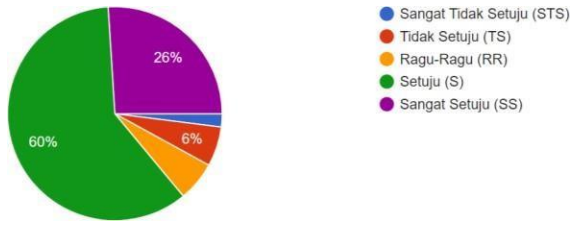
12.	The time available is sufficient to direct students to discover concepts independently	Depends on the material. Some have enough time, some are tight
Support for Model Use		
13.	I support the application of Discovery Learning in teaching and learning activities	I really support it, especially in accordance with the Independent Curriculum
14.	This model should be expanded in use in the school curriculum	Yes, because it can improve students' thinking abilities
15.	I would suggest Discovery Learning to other teachers as an alternative method	Of course, I have shared this with colleagues about this
16.	I believe other teachers can also adopt the Discovery Learning model well	As long as there is training and application examples, I'm sure it can be done

Table 1. Teacher Interview

Below are some of the questions presented in the questionnaire and the results of responses from students as follows.

No	Question	Student Response	Graph
Interest in participating in learning with discovery activities			
1.	Interest in participating in learning with discovery activities	The graph above shows that as many as 48% of students agreed, 26% were still unsure, while 16% strongly agreed, and 8% disagreed and 2% strongly disagreed	
2.	I feel happy participating in learning when I am asked to find out the material myself	The graph above shows that 46% of students agreed, 26% were still unsure, while 10% strongly agreed, and 14% disagreed and 4% strongly disagreed	
Curiosity about concepts that have not been explained directly			

3.	I want to immediately know new concepts when the teacher doesn't immediately explain them	The graph above shows that 54% of students agreed, 22% were still unsure, while 18% strongly agreed, and 6% disagreed and 0% strongly disagreed	
4.	I become more curious when faced with questions or phenomena that the teacher has not explained	The graph above shows that 52% of students agreed, 26% were still unsure, while 12% strongly agreed, and 4% disagreed and 4% strongly disagreed	
Ease of understanding concepts when learning through discovery			
5.	I find physics concepts easier to understand once I discover them myself	The graph above shows that 58% of students agreed, 22% were still unsure, while 12% strongly agreed, and 4% disagreed and 4% strongly disagreed	
6.	Learning by discovering it myself makes me understand the material more deeply	The graph above shows that as many as 60% of students agreed, 22% were still unsure, while 16% strongly agreed, and 2% disagreed and 0% strongly disagreed	
Learn without depending on the teacher			
7.	I feel able to learn and understand concepts without always having the help of a teacher	The graph above shows that as many as 42% of students agreed, 24% were still unsure, while 12% strongly agreed, and 20% disagreed and 2% strongly disagreed	

8.	I am used to looking for answers myself before asking the teacher	The graph above shows that as many as 42% of students agreed, 30% were still unsure, while 10% strongly agreed, and 16% disagreed and 2% strongly disagreed	
Active in experiments and discussions			
9	I actively discuss with friends when carrying out concept discovery activities	The graph above shows that as many as 46% of students agreed, 12% were still unsure, while 32% strongly agreed, and 8% disagreed and 2% strongly disagreed	
10.	I am directly involved in observations or experiments during learning	The graph above shows that as many as 46% of students agreed, 20% were still unsure, while 20% strongly agreed, and 12% disagreed and 2% strongly disagreed	
Comfortable working in small groups			
11.	I feel comfortable working in groups when conducting discovery activities	The graph above shows that as many as 60% of students agreed, 6% were still unsure, while 26% strongly agreed, and 6% disagreed and 2% strongly disagreed	
12.	I can work together with friends in understanding concepts through group discussions	The graph above shows that as many as 48% of students agreed, 18% were still unsure, while 32% strongly agreed, and 2% disagreed and 0% strongly disagreed	

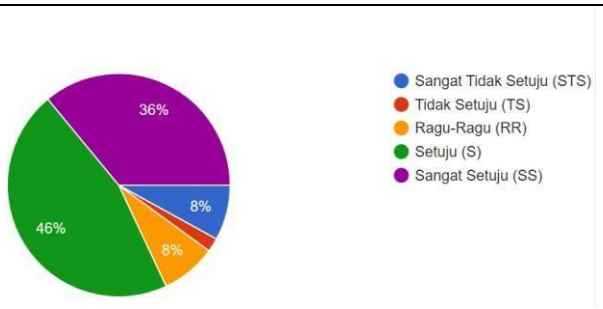
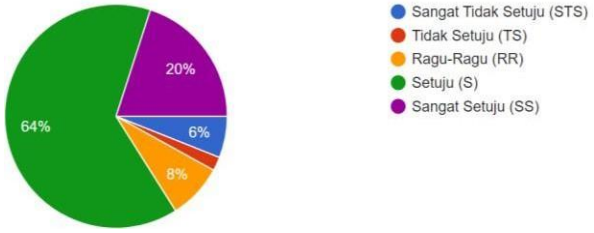
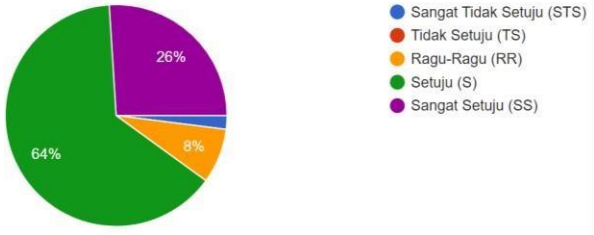
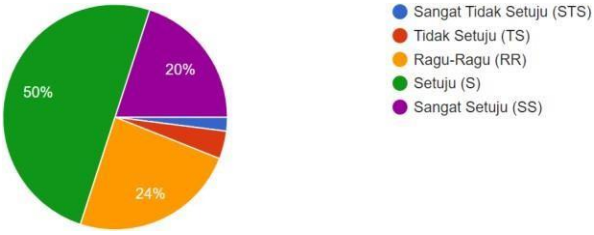
Satisfaction with the results of one's own discoveries			
13.	I feel proud when I succeed in finding a concept without the help of a teacher	The graph above shows that 46% of students agreed, 8% were still unsure, while 36% strongly agreed, and 2% disagreed and 8% strongly disagreed.	
14.	I am satisfied with the learning results I achieved through my own discovery	The graph above shows that as many as 64% of students agreed, 8% were still unsure, while 20% strongly agreed, and 2% disagreed and 6% strongly disagreed.	
Perseverance when facing learning difficulties			
15.	I keep trying to find solutions even though I face difficulties	The graph above shows that 64% of students agreed, 8% were still unsure, while 26% strongly agreed, and 0% disagreed and 2% strongly disagreed	
16.	I don't give up easily when the concept I'm looking for is difficult to understand	The graph above shows that as many as 50% of students agreed, 24% were still unsure, while 20% strongly agreed, and 4% disagreed and 2% strongly disagreed	

Table 2. Results of Student Response Questionnaires

Teachers and students assess that the application of Discovery is very useful for improving the learning process in schools. Teachers feel this model is more effective and helps students to increase student involvement and understanding, while students feel learning with Discovery Learning is more interesting, active and meaningful.

Discovery-based learning is useful for facilitating students to understand concepts in more depth, as well as fostering a scientific attitude and increasing learning motivation. Using this model encourages students to

be able to search for scientific concepts independently and in groups. In fact, Discovery Learning also supports students to be more active and independent in managing their own learning process

Through active involvement of students in experiments and concept discovery, this method is considered effective in developing students' level of thinking. A number of research results describe a structured discovery approach that can increase student participation during the learning process.

However, implementing discovery-based learning still requires mental readiness and independent learning from students, because they have to design and carry out their own experiments to discover the concepts being studied. This process certainly requires a lot of time. Therefore, in its implementation, support is needed in the form of guidance or scaffolding so that students remain on the right track during the discovery process.

The steps in the Discovery Learning model are designed so that students can easily recognize parts of the material that they understand and those that are still confusing. That way, they can learn to be more focused and directed.

If this model is combined with a cognitive conflict approach, the results can be more optimal. This approach helps students to discover contradictions or conflicts in the concepts they are studying, so that it can trigger deeper understanding. Previous research shows that the combination is very relevant to students' mastery of concepts significantly, especially in physics learning.

IV. CONCLUSION

This article describes the attitude of high school physics teachers who give positive responses and want to implement the Discovery Learning model. Where teachers must also understand the stages of good and effective learning when teaching. As for the students, they are very enthusiastic and interested in participating in discovery-based learning or what is known as Discovery Learning. However, in its implementation it also requires support from schools such as laboratories, professional teachers, development of discovery-based teaching modules, the existence of LKPD and others.

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