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The Effects of Learning Strategies and Learning Styles on Learning Outcomes of Basic Physics

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***ABSTRACT**--This study aims to determine the effect of learning strategies and learning styles on learning outcomes of Basic Physics from Physics Department Students at FKIP Halu Oleo University, while the learning strategies provided in the experimental class are inquiry learning strategies. This research was conducted on students majoring in physics at the faculty of education and education at Halu Oleo University which lasted eight meetings. In this study the data were obtained by giving a test of learning outcomes to 94 students. The research method used was a quasi-experimental method with a 2x2 design. Data were analyzed using two-way ANOVA. The results showed that there were differences in student learning outcomes between those learned using inquiry learning strategies and those learned using direct learning, the average Basic Physics learning outcomes learned with inquiry learning strategies were higher compared to the average learning outcomes of Basic Physics students who were learned with use direct learning strategies, learning styles affect student learning outcomes Basic Physics; there is an interaction between learning strategies, learning styles and learning outcomes in Basic Physics*

***Keywords--** Learning Strategies, Learning Style, and Learning Outcomes*

I. INTRODUCTION

The Physics one of the important subjects taught in tertiary institutions especially in the fields of science that are included in the category *science which* learns about the nature and natural phenomena or natural phenomena as well as all interactions within them and aims to predict and understand how matter and energy behave, in other words, through physics we can predict and understand how the universe works. Description of the decline in the average value of Physics subjects at the provincial and national levels, namely in 2015 were 72.91 and 67.43 while in 2016 were 67.72 and 54.83. The decline in average value of Physics is one of the problems that very basic in the Department of Physics Education UHO, so that by teaching lecturers of Basic Physics courses need to make a variety of new innovations related to the learning strategies used. As Killen (2007)) states that: "*No teaching strategy is better than others in all circumstances, so you have to be able to use a variety of teaching strategies and make rational decisions about when each one is likely to be the most effective.* Referring to the achievement

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of student learning outcomes in the 2016/2017 Academic Year Basic Physics course, students who reach the minimum completeness, who score 75≥, do not reach 75%. If you leave the conditions of maximum completeness the results will be fatal for students. Inappropriate selection strategies such as those that have been used often by lecturers to teach Basic Physics courses, only use conventional methods such as lectures, exercises questions without giving freedom to solve problems creatively in their own way make students often feel dictated to follow the wishes of lecturers without considering their respective ways and learning styles. If this phenomenon is allowed to continue it will result in not achieving KKNI-based curriculum goals that emphasize the mastery of certain theoretical concepts in the field of knowledge in general and the theoretical concepts of specific sections in the field of knowledge in depth, and able to formulate the resolution of procedural problems. In addition, student freedom will be limited which causes the motivation to participate in learning decreases because it feels that what is done is not right so that the creativity of students will not grow in ith well. For that reason, lecturers are expected to have a lot of knowledge about the strategies used to provide assistance to students to overcome problems in participating in learning, so that lecturers are no longer the only source of information, but as facilitators, motivators who can create a learning atmosphere that allows students to learn well and optimally. Based on several research results, including Duran and Dokme research (2016: 2887-2908) as well as researches of Buchori, Setyosari, Dasna, Ulfa, Degeng and Sa'dija (2017: 137-145) recommend that learning that involves activeness students can improve 1) the ability to think critically and solve problems, 2) motivation and interest of students to learn, 3) interaction between lecturers and students and between students and students, and 4) the formation of student attitudes and performance. Based on the results of the research above, it is obtained that the active involvement of students in learning can increase the potential of students associated with critical thinking skills so as to solve problems, motivation and interest in learning, interaction and can foster positive attitudes and student performance related to the task that must be completed in learning. Thus, in the learning process, lecturers are expected to be able to apply theprocess skills *science or* physics, which will relate to the selection of strategies in learning. Based on the background stated above, to improve student learning outcomes in Basic Physics, the author views the need for innovation related to learning strategies that take into account student learning styles so as to create varied and innovative learning environments and conditions in accordance with technological developments that support the optimization of student thinking towards improved learning outcomes in Basic Physics better.

II. LITERATURE REVIEW

1.1 *Basic Physics of Learning Outcomes*

Learning is essentially a change in a person through experience. This is as stated by Driscoll, that "learning is defined as a change in an individual caused by experience. Learning is essentially a change in a person through experience. This is as stated by Driscoll, that "learning is defined as a change in an individual caused by experience. Learning is a relatively permanent change in behavior produced by formal education, education and training or informal experience (Slavin, 2016). Thus, changes that do not last long (non-lasting change) due to fatigue, motivation, maturation, or changes in organisms that are temporary does not qualify as learning. This opinion is in line with the definition put forward by Santrock (2011) that "learning can be defined as a relatively permanent influence on behavior, knowledge, and thinking skills that comes about through experience"; learning can be

defined as a relatively permanent influence on the behavior, knowledge, and thought that occurs through experience. Knowledge, attitudes, and skills produced by the learning process are generally referred to as learning outcomes as stated by Lambe (2007), namely the knowledge, skills and competencies that people have acquired as a result of learning and can demonstrate if needed in a recognition process "; knowledge, skills and competencies that a person acquires as a result of learning and can be demonstrated if needed in the introduction process.

2.2 Learning Strategies

Learning is "anything that is done purposely to facilitate learning";everything done intentionally to facilitate learning (Reigeluth & Carr-Chellman, 2009). As the definition stated by Lahadisi (2014) that "Strategies are general approaches to instruction that apply in a variety of content areas and are used to meet a range of learning objectives". a strategy for lecturers is a general approach to teaching that applies in various fields of material and is used to meet various learning objectives.

III. LEARNING STRATEGY INQUIRY

Learning is a strategy that is designed to bring students directly into the scientific process through exercises that utilize the scientific process in a certain period of time with the belief that this strategy can develop learning independence Bruce & Weil (1978), Furthermore, also said on the same page that said, children basically have acuriosityand a high desire to grow and develop. This is in line with the definition proposed by Rustaman (2005) "Inquiry-based teaching is another instructional approach that has been developed for the purpose of teaching students how to think"; Inquiry-based learning is an approach developed for the purpose of learning students how to think. In line with this definition, according to Kilbane & Milman (2010) that inquiry learning is:

A process-oriented instructional model that aims to teach students the skills, knowledge, and dispositions required for thinking systematically to answer important questions. Through participation in the Inquiry model, students also develop knowledge of academic content that includes understanding of facts, principles, and concepts within a meaningful context of solving a problem -oriented learning model that aims to teach students skills, knowledge, and dispositions needed to think systematically to answer important questions.

Learning through inquiry is a process of developing and testing ideas, so that to be successful, this strategy must be carried out systematically. The main stages of guided inquiry learning strategies and the responsibilities of lecturers in their implementation specifically can be seen in Table 2.2 follows:

Table 2.1: Stages of Guided Inquiry Learning Strategy

Stages of	Lecturer Responsibilities
1) Statement of the problem*(thestatement of the*problem)	Helping students in the choice of issues, clarify issues through question and answer sessions, helping to make the problem into meaningful and manageable.

2) Development of hypotheses (*development of hypotheses*)	Helps formulate hypotheses through questions and answers, accept all relevant hypotheses, help clarify hypotheses, help students focus on a number of hypotheses that can be managed.
3) Collection(*of relevant datacollection of relevant data*)	Guiding students to find relevant sources for developing data, methods of collecting, guiding students to data sources, providing references as far as possible, allocating time for students to collect data if needed.
4) Analysis and interpretation (*analysis and interpretation*)	Use questions to clarify data, investigate the various sources of data used, organize all data collected, identify relationships between data collected.
5) Reporting*conclusions*.	Provides a reporting system or helps students determine the types of conclusions and generalizations that can be made in relation to hypothesis verification.

b. Learning Strategies Direct

Learning is often called "whole-group" learning or "(teacher-led instructionteacher-led instruction), which is an academic-focused learning strategy by giving choices of activities that tend to be oriented towards large groups, and emphasizing factual knowledge direct. In line with the above definition, suggest that the termlearning has been used by researchers to refer to:

A pattern of teaching that consists of the teacher's explaining a new concept or skill to students, having them test their understanding by practicing under teacher direction (that is, controlled practice), and encouraging them to continue to practice under teacher guidance (guided practice).

According to Xu, & Stronge (2018), "Direct instruction is an approach that focuses on making implicit understanding explicit and available for immediate use ... It aims to help students understand not only the importance of certain knowledge or skills but also how and why they work"; Direct learning is an approach that focuses on creating implicit understanding to be explicit and can be used immediately. Joyce, Weil and Colhoun explained that direct learning consists of five stages of activity including: orientation, presentation, structured practice, guided practice, and independent practice

IV. LEARNING STYLES

Although experts define learning styles in different ways, these definitions refer to the same understanding, here are some expert definitions of learning style definitions (Pashler, McDaniel, Rohrer, & Bjork, 2009):

1) "Learning style is usually defined as the way a person approaches learning and studying" Learning styles are usually defined as the way a person approaches learning.

2) "Learning style orientation for approaching learning tasks and processing information in certain ways" learning style is an orientation to approach learning tasks and process information in certain ways.

3) "Learning style is students 'personal approaches to information processing and problem solvingstudents' personal approaches to information processing and problem solving; learning styles are.

4) "Learning styles are stable individual variations in perceiving, organizing, processing, and remembering information"; learning styles are stable individual variations in understanding, organizing, processing, and remembering information

5) "Learning styles refer to the preferred ways in which individuals interact with, take in, and process new stimuli or information. In other words, your preferred learning style is simply how you learn best.(Hopper 2010: 178); Learning style refers to the preferred way in which individuals interact with, receive, and process new stimuli or information. In other words, your chosen learning style is the way you study well

6) "Learning styles refer to the strengths and preferences that people exhibit in the ways they take in and process information"; Learning styles refer to the strengths and choices people show in how they receive and process information.

V. METHODOLOGY/MATERIALS

Method used in the study used quasi-experimental consisting of independent variables and dependent variables. The dependent variable is the result of basic physics learning and the independent variables are (1) inquiry learning strategies and direct learning strategies and moderator variables are learning styles.

The population in this study were students majoring in Physics Education at the University of Halu Oleo who were enrolled in Academic Year 20018/2019 which consisted of two classes with a total of 94 people. Each is called the experimental group and the control class. The samples netted in this study were a number of 50 Class A students in the Physics Education Study Program and 44 Class B Physics Education Study Programs. Before the treatment was given to the two experimental classes,first given *questionnaire was* a learning styleto obtain score data on learning styles to identify the learning styles that the sample had.

Based on the target population and the sampling technique in this study, the experimental class is a physics education program class A student and the control class is a physics major student in Class B.

Table 2: Details of The sample members identified according to learning

Learning Style (B)	Learning Strategies (A)	
	A1	A2
Kinesthetic (B1)	28	19
Visual (B2)	22	25
Total	50	44

The statistic used to test the hypothesis in this study is the two-way ANAVA test with a 2 X 2 factorial design. Test with two-way ANAVA is to investigate a major or major(*effectmain effect*) one minor effect (*simple effect)* and one interaction effect (*Inteaction effecteffect*). The mainin this study is the difference in learning strategies (direct inquiry learning) on learning outcomes of Basic Physics. Minor influence is learning style on the results of learning basic physics. While the effect of interaction is the influence of learning strategies and learning styles on learning outcomes of Basic Physics.

VI. RESULTS AND FINDINGS

Descriptive analysis results in this study are as follows

Table 4.1: Results of descriptive analysis of research data

Learning Style (B)	Statistical Data	Learning Strategies Learning outcomes Inquiry learning strategies (A_1)	Learning outcomeslearning strategies Direct(A_2)	Learning outcomes Based on learning styles
Kinesthetic (B_1)	n	28	19	47
	Average	78.81	65.55	73.759
	Median	80.00	63.33	76.67
	Minimum	60.00	53.33	53.33
	Maximum	90.00	80.00	90.00
	Save Standard	10.26	9.55	10.39
Visual (B2)	n	22	25	47
	Mean	71.06	68.13	69.50
	Median	69.75	66.67	72.92
	Minimum	56.67	50.00	50.00
	Maximum	83.33	86.67	86.67

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	Save Standard	7.86	10.89	9.06
n		50	44	
Average		75.13	67.34	
The median is		76.67	66.67	
Minimum		56.67	50.00	
A maximum of		90.00	86.67	
Standard Deviation		8.57	10.25	

The results of data analysis calculations with ANAVA two paths from the results of learning Basic Physics in this study, in detail can be seen in Appendix 9. The results of the data analysis can be described as in Table. 4.11 below

Table 4.2: ANAVA Two pathways for learning outcomes Basic Physics

VARIANCE SOURCE	db	JK	RJK =	F_h =	F_t
					$\alpha = 0.05$
Learning Strategies (A)	1	1517,2	1517,2	18,588	3.96
Learning Styles (B)	1	425.53	425.53	5,213	3.96
Interactions (AB)	1	6496.4	6496.4	4,286	3.96
In Groups	90	7346,1197	81,623	-	-
Total Reduced	93	9638,771	-	-	-

VII. CONCLUSION

Based on the results of the analysis obtained in Chapter IV about the effect of learning strategies and learning styles on learning outcomes of Basic Physics, it can be concluded as follows:

1. The results of students learning the Basic Physics who are taught using inquiry learning strategies are higher than those using strategies direct learning
2. Basic physics learning outcomes of students who have a kinesthetic learning style higher than those who have a visual learning style
3. There is a significant interaction effect between learning strategies and learning styles on learning outcomes of Basic Physics

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