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# Effectiveness of form of assessment and learning style on students learning achievement in phisics of class XI IPA AT SMA Negeri 1 Airmadidi

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**Abstract**
Understanding of student's learning style should be understood to support an efficient learning. Teaching and learning activities with students' learning styles can affect student learning achievement. This study aims to determine differences in physics learning achievement are taught using a form of assessment, namely, performance assessment and portfolio assessment in terms of students' learning styles. This research method is a quasi-experiment. The study population was all students of class XI IPA at SMA Negeri 1 Airmadidi to sample as many as 64 students. Analysis of the data using analysis variant treatment by level. During the study the results obtained with the conclusion that: (1) there are differences in physics learning achievement significantly between the students taught using performance assessment and the students taught using portfolio assessment, (2) there is interaction between form of assessment and learning styles in physics learning achievement, (3) there are differences in physics learning achievement significantly between the students taught using performance assessment with kinesthetic learning style and the students taught using portfolio assessment with kinesthetic learning style, (4) there are differences in physics learning achievement significantly between the students taught using performance assessment with auditory learning style and the students taught using portfolio assessment with a auditory learning style.

**Keywords:** assessment, learning styles, learning achievement

## 1. Introduction

The aim of national education of Indonesia is to educate the life of the nation and develop Indonesian people as a whole, namely humans who have faith in God Almighty and noble character, have knowledge and skills, physical and spiritual health, a solid and independent personality and a sense of social and national responsibility ( National Education Standards Agency, 2006) [1]. This noble goal certainly cannot be achieved easily, because it requires hard work, high awareness, cooperation between the components of education, and the development of educational patterns that are right on target [2].

All aspects of education must be in accordance with this noble goal. One of them is the assessment aspect [3]. Assessment is a form of benchmark for deciding whether something is feasible or not is stated correctly. The assessment process is applied not only on matters relating to data, products, or an activity. Assessment is also applied to the educational process aimed at humans in this case students. The purpose of the assessment is to know someone's performance. Assessment is intended here is a procedure to determine student performance. Nowadays educators or teachers tend to only use written assessments to monitor the extent to which learning Achievement can be achieved by students. Is there an increase in the quality of learning in students? In addition to written assessments, there are also 3 types of assessments, namely project appraisal, portfolio assessment and performance assessment [4].

Physics subjects are lessons that require a scientific approach, which of course must be done with performance. Through physics teaching and learning activities, students are expected to develop experiences to be able to formulate problems, submit and test hypotheses through experimentation, collecting, processing and interpreting data and communicating the results of experiments verbally and in writing (National Education Standards Agency, 2006)

As explained, Physics subjects need a form of assessment that is in accordance with the concept. The form of assessment used must also give effect to students in this learning so that students do not easily forget and understand the lessons delivered by the teacher. In this case, there are two forms of assessment that can be used in this learning, namely portfolio assessment and performance assessment. Portfolio assessment is an assessment based on the collection of students' work on the lessons they carry out. Collection of tasks can help students better recognize and understand the lesson because it provides an opportunity for students to learn and find out the lesson [5].

Performance appraisal is an assessment based on the actual work that students do on the lessons they carry out. In this discussion the researcher discusses two types of assessment, namely, portfolio assessment and performance assessment.

In addition to the forms of assessment that affect learning Achievement, there are also learning styles that are inseparable from learning. Besides the form of assessment, it must also be considered the learning style of each student so that when the assessment is applied, it can be in accordance with students' learning abilities [6]. Most teachers only see how far students understand with assessments that are not in accordance with learning. As a result, there are students who understand the lesson according to their learning style but there are also those who do not understand because it is not in accordance with their learning style [7].

Every student has their own learning style and this affects the success of students in the lessons they are doing. There are 2 types of learning styles that will be observed here, namely, kinesthetic learning styles and auditory learning styles.

The form of assessment used by paying attention to student learning styles provides opportunities to improve learning Achievement [8]. The learning process by emphasizing the thinking process provides an opportunity for students to explain their ideas during teaching and learning activities [9]. Teaching and learning activities by giving assignments greatly help students play more active roles in learning activities. So that in line with the assessment, learning styles must also be considered.

Based on some of the thoughts mentioned above, the author is interested in conducting research with the title "Effectiveness Of Form Of Assessment And Learning Style On Students Learning Achievement In Phisics Of Class Xi IPA At SMA Negeri 1 Airmadidi"

## Research Methods

This study uses quasi-research methods. Classes are divided into two groups, namely the experimental class 1 and the experimental class 2. The experimental class 1 is treated using portfolio assessment, while the experimental class 2 is treated using performance assessment. Each class is grouped based on student learning styles. In the experimental class 1 grouped in two groups, namely the performance assessment group with kinesthetic learning styles and performance assessment groups with auditory learning styles. In the experimental class 2 grouped in three groups, namely the portfolio assessment group with kinesthetic learning styles and portfolio assessment groups with auditory learning styles. The research design used is the Anava by level treatment design as seen in table 1 below.

**Table 1:** Design treatment by level

| Learning Style | Forms of Assessment | |
|---|---|---|
| | $A_1$ | $A_2$ |
| $B_1$ | $A_1$ $B_1$ | $A_2$ $B_1$ |
| $B_2$ | $A_1$ $B_2$ | $A_2$ $B_2$ |

Information:
**A1:** Performance Assessment
**A2:** Portfolio Assessment
**B1:** Kinesthetic Learning Style
**B2:** Auditory Learning Style
**A1 B1:** Performance Assessment with kinesthetic learning styles
**A2 B1:** Portfolio Assessment with kinesthetic learning styles
**A1 B2:** Performance Assessment with auditory learning styles
**A2 B2:** Portfolio Assessment with auditory learning styles

## Results and Discussion

### Results

Based on the data from the results of this study consisting of 3 independent variables, namely performance appraisal (A1), portfolio assessment (A2), learning style (B), and one dependent variable namely learning Achievement (Y).

Student learning Achievement data are obtained from performance assessment, portfolio assessment and through cognitive tests. Data taken then processed using Microsoft Office Excel 2007.

Based on the results of the study the influence of the form of assessment and learning style on the results of student physics learning in Airmadidi 1 Public High School class XI IPA 1 and XI IPA 3 class totaling 60 students, the research data can be seen in Table 1.2.

**Table 2:** Descriptive Statistics of learning Achievement

| | A1 | A2 | B1 | B2 | A1B1 | A1B2 | A2B1 | A2B2 |
|---|---|---|---|---|---|---|---|---|
| N | 32 | 32 | 32 | 32 | 16 | 16 | 16 | 16 |
| Mean | 79,81 | 77,87 | 79,75 | 77.93 | 80.11 | 77.04 | 79.62 | 80.33 |
| Median | 78 | 79 | 80 | 76 | 78 | 78 | 79 | 79 |
| Mode | 75 | 79 | 80 | 75 | 80 | 75 | 79 | 80 |
| Std. deviation | 6.98 | 7 | 6.61 | 7.36 | 4.78 | 7.56 | 7.27 | 6.61 |
| Variance | 48.79 | 49.09 | 50.43 | 61.67 | 22.86 | 57.29 | 60.21 | 43.75 |
| Range | 32 | 24 | 20 | 36 | 15 | 32 | 24 | 19 |
| Minimum | 58 | 70 | 70 | 58 | 75 | 58 | 70 | 70 |
| Maximum | 90 | 94 | 90 | 94 | 90 | 90 | 94 | 89 |
| Sum | 500.58 | 511.96 | 508.79 | 517.96 | 461.75 | 490.89 | 509.1 | 483.69 |

### Distribution Table Frequency of learning Achievement Physics Student Groups taught using Performance Assessment

**Table 3**

| SKR | NT | BK | FA | FK | FR (%) |
|---|---|---|---|---|---|
| 70-74 | 72 | 69,5-74,5 | 6 | 6 | 18.75 |
| 75-79 | 77 | 74,5-79,5 | 9 | 15 | 28.125 |
| 80-84 | 82 | 79,5-84,5 | 8 | 23 | 25 |
| 85-89 | 87 | 84,5-89,5 | 6 | 29 | 18.75 |
| 90-94 | 92 | 89,5-94,5 | 3 | 32 | 9.375 |
| | | | 32 | | 100 |

As for the spread pattern can be seen in the graph below

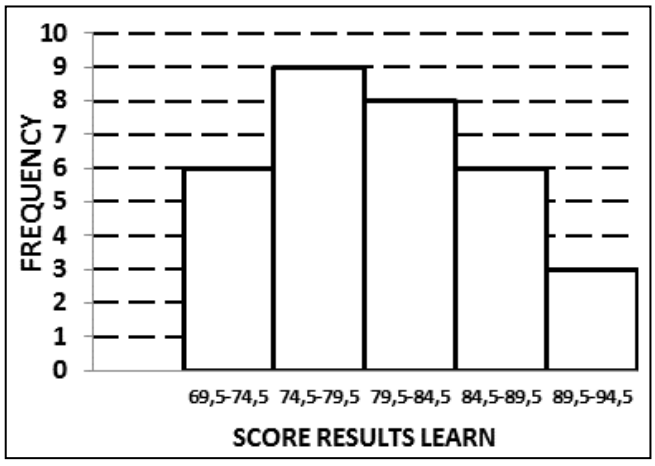


**Fig 1**: Distribution Table Frequency of learning Achievement Physics Student Groups taught using Portfolio Assessment

**Table 4**

| SKR | NT | BK | FA | FK | FR (%) |
|---|---|---|---|---|---|
| 58-64 | 61 | 57,5-64,5 | 2 | 2 | 6.25 |
| 65-71 | 68 | 64,5-71,5 | 2 | 4 | 6.25 |
| 72-78 | 75 | 71,5-78,5 | 12 | 16 | 37.5 |
| 79-85 | 82 | 78,5-85,5 | 14 | 30 | 43.75 |
| 86-92 | 89 | 85,5-92,5 | 2 | 32 | 6.25 |
| | | | 32 | | 100 |

As for the spread pattern can be seen in the graph below

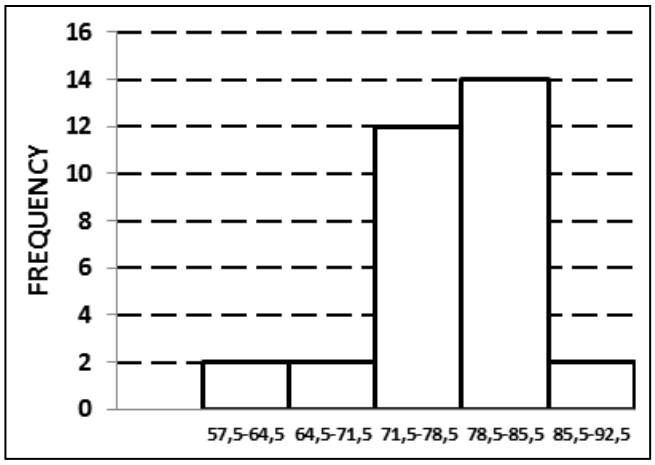


**Fig 2:** Frequency Distribution Table of Student Physics Group learning Achievement with Kinesthetic Learning Style

**Table 5**

| SKR | NT | BK | FA | FK | FR (%) |
|---|---|---|---|---|---|
| 70-75 | 72,5 | 69,5-75,5 | 9 | 9 | 28.125 |
| 76-81 | 78,5 | 75,5-81,5 | 13 | 22 | 40.625 |
| 82-87 | 84,5 | 81,5-87,5 | 5 | 27 | 15.625 |
| 88-93 | 90,5 | 87,5-93,5 | 3 | 30 | 9.375 |
| 94-99 | 96,5 | 93,5-99,5 | 2 | 32 | 6.25 |
| | | | 32 | | 100 |

As for the spread pattern can be seen in the graph below

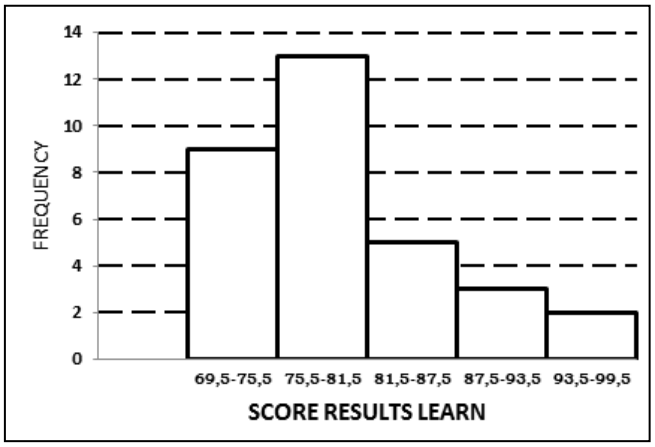


**Fig 3:** Distribution Table Frequensy learning Achievement of Physics of Student Groups with Auditory Learning Style

**Table 6**

| SKR | NT | BK | FA | FK | FR (%) |
|---|---|---|---|---|---|
| 58-62 | 60 | 57,5-62,5 | 1 | 1 | 3.125 |
| 63-67 | 65 | 62,5-67,5 | 2 | 3 | 6.25 |
| 68-72 | 70 | 67,5-72,5 | 2 | 5 | 6.25 |
| 73-77 | 75 | 72,5-77,5 | 9 | 14 | 28.125 |
| 78-82 | 80 | 77,5-82,5 | 10 | 24 | 31.25 |
| 83-87 | 85 | 82,5-87,5 | 5 | 29 | 15.625 |
| 88-92 | 90 | 87,5-92,5 | 3 | 32 | 9.375 |
| | | | 32 | | 100 |

As for the spread pattern can be seen in the graph below

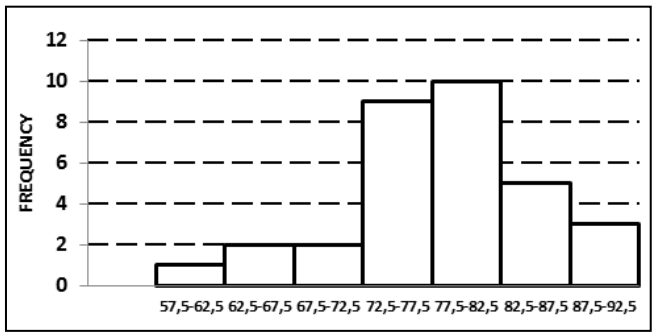


**Fig 4:** Frequency Distribution Table learning Achievement of Physics Groups Students who are taught use the Kinesthetic Learning Style Performance Assessment

**Table 7**

| SKR | NT | BK | FA | FK | FR (%) |
|---|---|---|---|---|---|
| 75-77 | 76 | 74,5-77,5 | 3 | 3 | 18.75 |
| 78-80 | 79 | 77,5-80,5 | 2 | 5 | 12.5 |
| 81-83 | 82 | 80,5-83,5 | 2 | 7 | 12.5 |
| 84-86 | 85 | 83,5-86,5 | 5 | 12 | 31.25 |
| 87-89 | 88 | 86,5-89,5 | 2 | 14 | 12.5 |
| 90-92 | 91 | 89,5-92,5 | 2 | 16 | 12.5 |
| | | | 16 | | 100 |

As for the spread pattern can be seen in the graph below

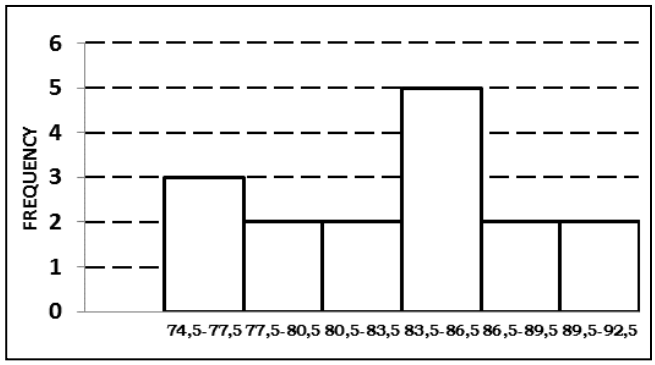


**Fig 5:** Requency Distribution Table learning Achievement Physics Groups Students who are taught use the Auditory Performance Style Learning Assessment

**Table 8**

| SKR | NT | BK | FA | FK | FR (%) |
|---|---|---|---|---|---|
| 58-63 | 60,5 | 57,5-63,5 | 2 | 2 | 12.5 |
| 64-69 | 66,5 | 63,5-69,5 | 2 | 4 | 12.5 |
| 70-75 | 72,5 | 69,5-75,5 | 5 | 9 | 31.25 |
| 76-81 | 78,5 | 75,5-81,5 | 3 | 12 | 18.75 |
| 82-87 | 84,5 | 81,5-87,5 | 2 | 14 | 12.5 |
| 88-93 | 90,5 | 87,5-93,5 | 2 | 16 | 12.5 |
| | | | 16 | | 100 |

As for the spread pattern can be seen in the graph below

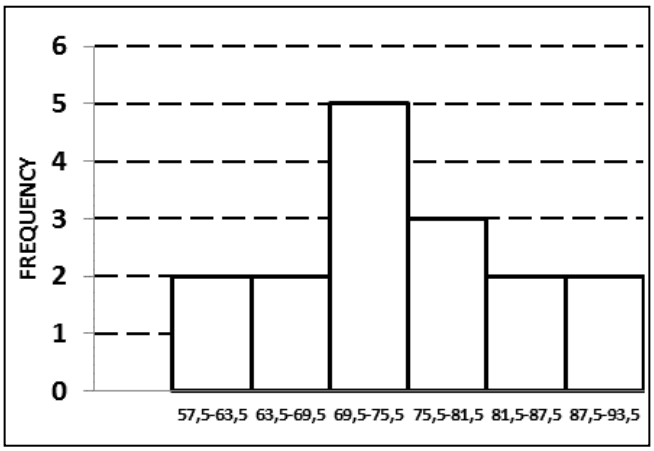


**Fig 6:** Frequency Distribution Table learning Achievement of Physics Group Students taught using Portfolio Assessment with Kinesthetic Learning Style

**Table 9**

| SKR | NT | BK | FA | FK | FR (%) |
|---|---|---|---|---|---|
| 70-75 | 72,5 | 69,5-75,5 | 7 | 7 | 43.75 |
| 76-81 | 78,5 | 75,5-81,5 | 4 | 11 | 25 |
| 82-87 | 84,5 | 81,5-87,5 | 2 | 13 | 12.5 |
| 88-93 | 90,5 | 87,5-93,5 | 2 | 15 | 12.5 |
| 94-99 | 96,5 | 93,5-99,5 | 1 | 16 | 6.25 |
| | | | 16 | | 100 |

As for the spread pattern can be seen in the graph below

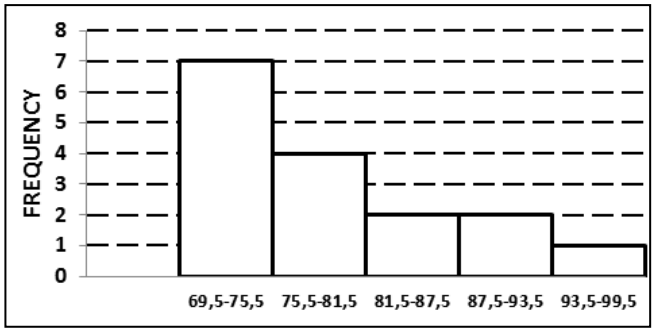


**Fig 7:** Frequency Distribution Table learning Achievement Physics Groups Students taught using Portfolio Assessment with Auditory Learning Style

**Table 10**

| SKR | NT | BK | FA | FK | FR (%) |
|---|---|---|---|---|---|
| 70-74 | 72,5 | 69,5-74,5 | 2 | 2 | 12.5 |
| 75-78 | 76,5 | 74,5-78,5 | 2 | 4 | 12.5 |
| 79-82 | 80,5 | 78,5-82,5 | 3 | 7 | 18.75 |
| 83-86 | 84,5 | 82,5-86,5 | 6 | 13 | 37.5 |
| 87-90 | 88,5 | 86,5-90,5 | 3 | 16 | 18.75 |
| | | | 16 | | 100 |

As for the spread pattern can be seen in the graph below

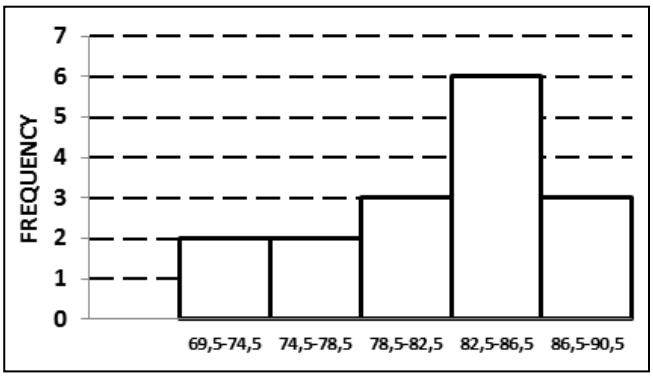


**Fig 8**

**Discussion**

In this learning activity the research applied practicum activities with two treatments. Experiment class 1 uses performance assessment and experimental class 2 uses portfolio valuation. Experimental class 1 and experimental class 2 were divided into two categories of learning styles, namely kinesthetic learning styles and auditory learning styles.

The results of testing the first hypothesis show that the learning Achievement of groups of students who use performance appraisal are higher than the learning Achievement of groups of students who use portfolio valuations. These results can be seen from the average learning Achievement where the performance assessment group has an average value of 79.81 and the portfolio assessment group has an average value of 77.87. Based on the results of the ANOVA test, the price of Fcount = 4.126> Ftable = 4.00 means that there are differences in physics learning Achievement between students taught using performance assessments and students taught using portfolio valuation

Based on the observations of researchers, the assessment of the skills of the class practicum process that uses performance appraisal has a higher dominant average value than the value of the class average using portfolio valuation [11]. In assessing performance, students tend to be required to be directly active in practicum tools and there are steps that LKP activities must do. Performance appraisal also spurs students to work together so that it affects the process skills of each student [12]. The portfolio assessment class is different from the performance appraisal class. In portfolio assessments, students in groups are given assignments regarding the material given and not directly involved in practical activities such as data collection, namely measuring, grouping and using tools that affect the activity of each student

Based on the learning results of cognitive tests of students who learn using performance appraisal, students are faced directly with the real learning process. In this class, students carry out learning activities by practicing directly the

material learned where students must observe, measure, use tools, process data, even calculate the results of retrieval of the data using the existing formula. This is very different from the class that uses portfolio valuation. In this class, students are only given assignments and then the task is collected, namely assignments regarding the material being studied.

The results of the first hypothesis testing show that groups of students with kinesthetic learning styles that use performance appraisals give higher results than groups of students with kinesthetic learning styles who use portfolio valuations. The average student learning Achievement that use performance appraisal with kinesthetic learning styles are 80.11 while the average student learning Achievement using portfolio assessment with kinesthetic learning styles are 79.62. Based on the results of the t-dunnet test calculation, the price of tcount = 4.608> t table 0.167.

Based on the observations of researchers in the field, students who have a kinesthetic learning style taught using performance appraisals have a higher value because they better interpret their abilities through practicum used in learning. Students who have kinesthetic learning styles can be taught by direct practice and not just sit still.

The results of testing the second hypothesis show that groups of students with auditory learning styles taught using performance appraisal methods yield lower results than groups of students with auditory learning styles who are taught using portfolio valuations. The average student learning Achievement that use performance appraisal with auditory learning styles are 77.04 while the average student learning Achievement using portfolio assessment with auditory learning styles are 80.33. Based on the results of the calculation of the t-dunnet test giving the price of t count = -1,735 <t table = -0,167

The results of testing the third hypothesis showed that groups of students with kinesthetic learning styles that used performance appraisals gave higher results than groups of students with auditory learning styles who used performance appraisals. The average student learning Achievement using performance appraisal with kinesthetic learning styles is 80.11 while the average student learning Achievement using performance assessment with auditory learning styles are 77.04. Based on the results of the t-dunnet test calculation, the price of tcount = 4.608> t table 0.167.

The results of testing the fourth hypothesis show that groups of students with kinestets learning styles taught using portfolio valuation methods yield lower results than groups of students with auditory learning styles who are taught using portfolio valuations. The average student learning Achievement using portfolio assessments with kinesthetic learning styles are 79.62 while the average student learning Achievement using portfolio assessment with auditory learning styles are 80.33. Based on the results of the calculation of the t-dunnet test giving the price of t count = -1,735 <t table = -0,167

The results of the fifth hypothesis testing show that there is an influence of the interaction between the form of assessment and learning styles on the results of learning physics. Based on anava test results for interaction effects (FAB) Fcount = 20.12> Ftable = 4.00 means that there is a significant interaction between the form of assessment and learning style towards the results of learning physics. This shows that there is a significant effect between student learning styles in the kinesthetic learning style group and auditory learning style by using performance appraisal and portfolio assessment on the results of learning physics.

The research conducted by Jumardi (2014) entitled The Effect of Learning Approaches and Styles on Student learning Achievement History provides results of research that show that the CTL learning approach provides higher learning Achievement than conventional learning approaches; [10] students with auditory learning styles provide higher learning Achievement than students who have auditory learning styles. The equation between the author and the research conducted by Jumardi is to examine students' learning styles. the difference, in the Jumardi study using a learning approach, while the author uses the form of assessment.

Based on the results of observations of researchers in the field, students who have auditory learning styles that are taught using portfolio valuation have a higher value because they better interpret their abilities through their sense of theories they hear and are used in learning.

## Conclusions

Based on the results of the research and discussion conducted it can be concluded that:

1. There are differences in physics learning Achievement that use performance appraisal with kinesthetic learning styles and physics learning Achievement that use portfolio valuation with kinesthetic learning styles.
2. There are differences in learning Achievement of physics taught using performance appraisal with auditory learning styles and physics learning Achievement that use portfolio valuation with auditory learning styles.
3. There are differences in physics learning Achievement taught using performance appraisals with kinesthetic learning styles and physics learning Achievement that use performance appraisal with auditory learning styles
4. There are differences in physics learning Achievement taught using portfolio valuation with kinesthetic learning styles and physics learning Achievement that use portfolio valuation with auditory learning styles.
5. There is an interaction between the form of assessment and student learning styles towards learning Achievement.

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