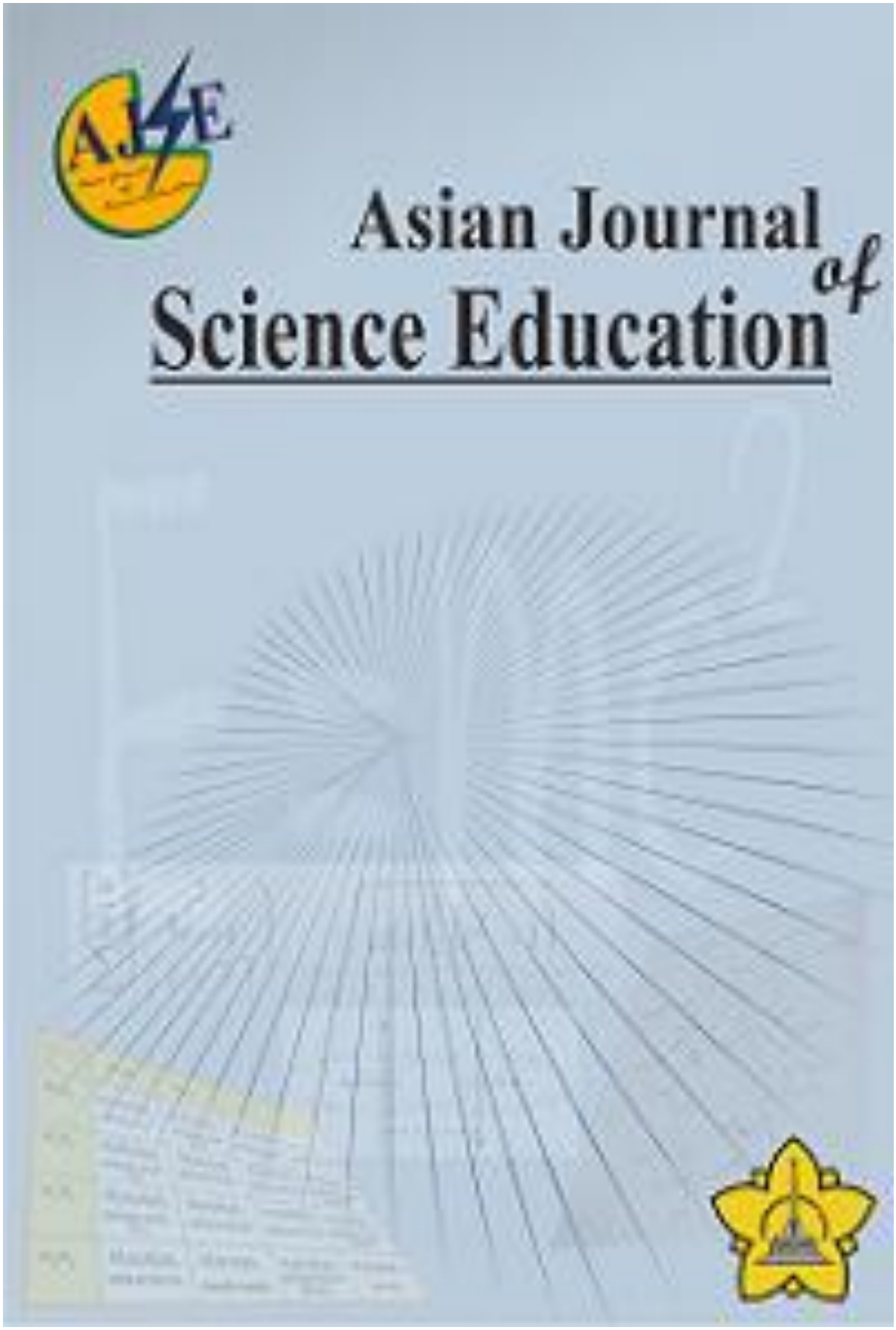
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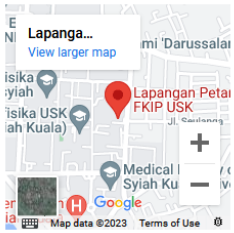

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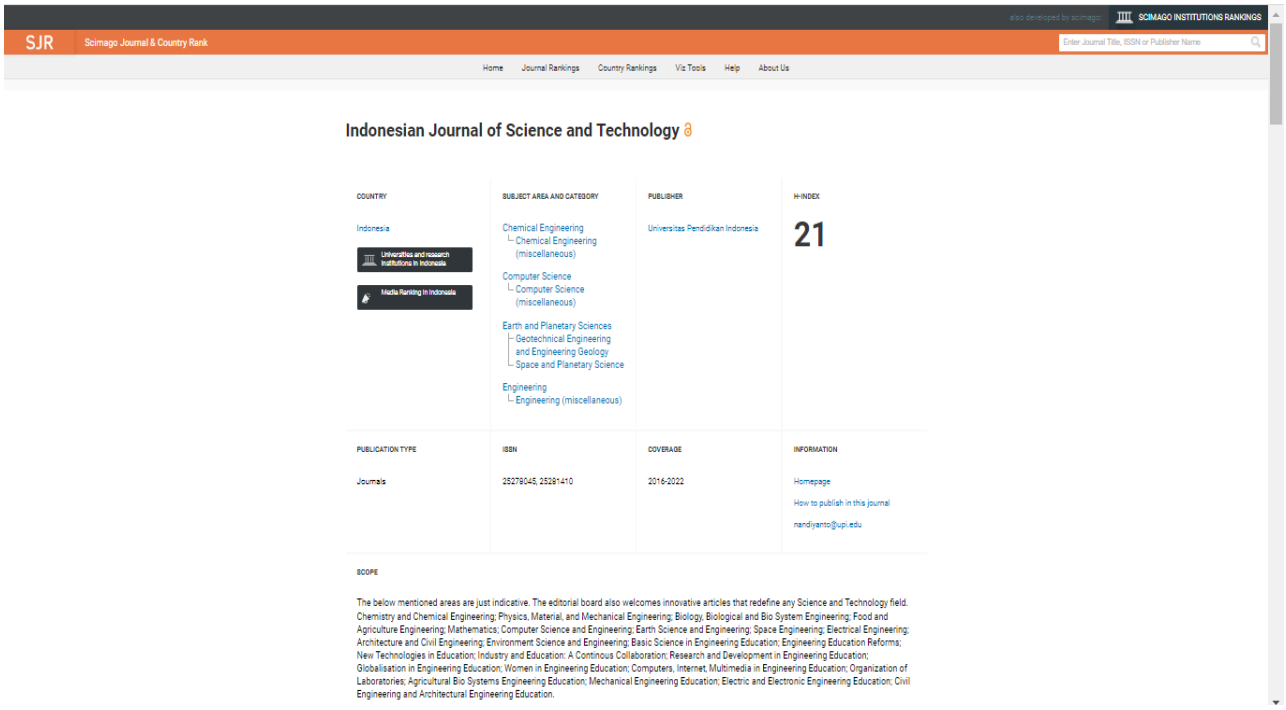

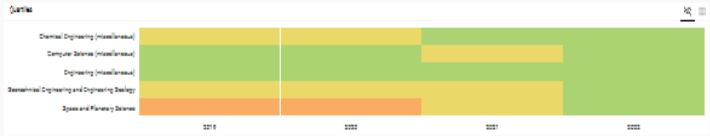

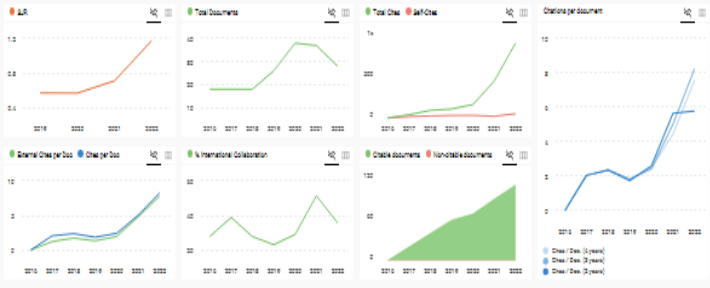

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Comparison of Learning Achievement Physics Education Students, FKIP-Unsyiah in Senior High School and Higher Education

D Fitriyani Dalimunthe[1], A Farhan[2*], A Wahyuni[2], Evendi[2], Nurulwati[2]

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ABSTRACT

Based on cognitive maturity, students of the Physics Education Department, Teacher Training and Education Faculty - Unsyiah when they were at the education level in Senior High School and College were in the same category, namely the early adult stage. That requires students could adjust to the pattern of learning life in higher education, especially first-year students who are in a transition period from high school to college. The purpose of this study was to compare whether the learning achievements obtained by Physics Education Students, Teacher Training and Education Faculty - Unsyiah were better than the achievements achieved at Senior High Schools. This type of research is a comparative study with a quantitative approach. The sampling technique used purposive sampling with a sample of 37 students of class 2018. The data was collected using the documentation method. Data were analyzed using the t-test equation. From the analysis, it can be seen that the results of the hypothesis test obtained are the t count = 7.05 with a significant level of $\alpha = 0.05$ and t table = 1.68, so the results are rejected H0 and accept Ha because of t count $\geq$ t table. It was concluded, that the learning achievement of Physics Materials from Physics Education Students, Teacher Training and Education Faculty - Unsyiah in the college was better than during high school.

Keywords: Learning achievement, senior high school, higher education, comparison

INTRODUCTION

Senior High School and Higher Education are two institutions whose learning activities are implemented by the syllabus and curriculum. High school students and university students experience a majors system. The major's system has been carried out from the Senior High School to be able to continue to the college level, when entering a university, majors are also carried out based on the subject of the courses taken. Each department has a lot of material with a different learning system. Entering the world of higher education means being involved in life situations and academic situations that are fundamentally different from what has been experienced in a high school environment. Higher education is not just a continuation of high school but is an essential part of the higher education level according to the demands of higher education. Kertamuda and Herdiansyah (2009: 12) state that "when a high school student

becomes a student at a university, it is a transitional phase that has many possibilities that could occur".

According to Gunarsa (2000), the pattern of lecturer-student relationships is very different compared to teacher-student relationships. Direct dialogue at the entry levels is rarely conducted in rooms where the number of students is usually large. The lecturers' attention to students is also less than teacher-student attention. The environment as the basis for teaching is a conditional factor faced by students to adapt to the college environment which has many different cultures and dynamics compared to the school environment, causing individuals to find new psychological equilibria that can increase their psychological maturity. So, even though in terms of age and maturity stage are relatively the same (Piaget's cognitive theory), the obstacles faced cause student learning / academic achievement to be more likely than when in high school (Tu'u, 2004). Based on the description that has been delivered, it is interesting to study and compare the learning achievements of Physics Education students while studying at Senior High Schools and while studying in Higher Education.

Problem of Research

The condition of students in terms of age and maturity stage is relatively the same when they are in the Senior high school and university according to Piaget's cognitive theory. However, the obstacles faced in college caused learning achievement could increase compared when they were in high school (Tu'u, 2004). Based on this, it is interesting to examine the comparison of student achievement between high school and higher education, especially in the Department of Physics Education, FKIP - Unsyiah.

Research Focus

This research was conducted to compare the learning achievement of students of the Department of Physics Education, FKIP - Unsyiah while in high school and university.

METHODOLOGY OF RESEARCH

General Background of Research

This research is a type of comparative research that uses a quantitative approach because the data obtained uses numbers and is analyzed using statistical formulas. This research was conducted at the Department of Physics Education, FKIP - Unsyiah.

Subject of Research

In this study, the authors took a sample of 37 Physics Department students of 2018. The sample was determined based on the consideration of the completeness required data. So, the purposive sampling technique was used for sampling from the population. Because only 37 students cooperatively provided SKHU data, the 37 students were designated as research samples.

Instrument and Procedures

Physics learning outcomes data at Senior High Schools are obtained from the Physics score in the Certificate of Examination Result (SKHU). Physics learning outcomes data at Higher Education are obtained from the score of the Basic Physics course. This data is obtained from the documentation of the lecturer who teaches the course. The Basic Physics course in the Physics Education Department, FKIP Unsyiah, consists of two courses. Basic Physics 1 is taught in the first semester and Basic Physics 2 is taught in the second semester. Due to various obstacles during the Covid 19 epidemic, only data on the value of the Basic Physics 2 course were from lecturers. Therefore, the sample score for the Basic Physics 2 course is used as student achievement in Physics lessons at Higher Education.

Data Analysis

The data in this study are quantitative data. Data were analyzed using the t-test equation. This test is one of the tests used to determine the significant difference between the two frequency distribution mean values of the variable data that is the target of a researcher (Sudjana, 2005). The t-test formula for different variants (unequal variance) uses the Separated Variance formula as follows (Sugiyono, 2011):

$$t = \frac{\overline{x_1} - \overline{x_2}}{\sqrt{\frac{{s_1}^2}{n_1} + \frac{{s_2}^2}{n_2}}}$$

Keterangan: t = t value
$\bar{x}_1$ = Average physics grade in senior high school
$\bar{x}_2$ = The average score of physics in Higher Education
${S_1}^2$ = Variance Physics grades in senior high school
${S_2}^2$ = Variance Physics grades in Higher Education
S_1 = Standard Deviation of Physics grades in senior high school
S_2 = Standard Deviation of Physics grades in higher education
n_1 = Number of students for physics grades in senior high school
n_2 = Number of students for physics grades in higher education

RESULTS AND DISCUSSION

The results of this study are described in detail in the recapitulation of the analysis results which are summarized in Table 1:

Table 1. Recapitulation of Frequency Distribution of Physics Scores Data for Senior High School (SHS) and Higher Education (HE)

No.	Description	SHS	HE
1	Class range	17,00	29,00
2	Many classes are 6-grade interval	6,00	6,00
3	Interval class length	3,00	6,00

4	Average frequency distribution	87,18	78,68
5	Variance	21,82	104,32
6	Standar Deviation	4,67	10, 21

Source: Physics Education Students Class of 2018, 2020 (Processed Data)

Calculated Chi-Square values and tables are listed in Table 2:

Table 2. Normality Test Data

No.	Score	A	χ^2_{hitung}	χ^2_{tabel}	Conclusion
1.	Physics score at SHS	0,05	5,94	11,07	Normal
2.	Physics score at HE	0,05	10,22	11,07	Normal

Source: Physics Education Students Class of 2018, 2020 (Processed Data)

Comparison of calculated Chi-Square values with table Chi-Square values at α = 0.05, for:

a. Physics score data from the sample at senior high school is 5.94 <11.07, and
b. Basic Physics 2 score data from the sample at higher education is 10.22 <11.07.

Referring to the decision making criteria, namely (Sudjana, 2005):

a. Reject H_0; if $\chi^2_{count} \geq \chi^2_{table}$, and
b. Accept H_0; if $\chi^2_{count} \leq \chi^2_{table,}$

The calculated Chi-Square value for both data groups is smaller than the Chi-Square value of the table. So, the distribution of this research data for the two groups spread normally at a significant level of 0.05 and degrees of freedom 6-1 = 5.

The results of the calculation of the variance equality test obtained $count$= 4,78. The distribution value of F table with a significant level of 5% degrees of freedom (dk) for the numerator = (n_1- 1) = 37 – 1 = 36 and dk denominator = (n_2- 1) = 37 – 1 = 36 obtained F_{table} is $F_{(0,05)(36:36)} = \frac{1,78 + 1,72}{2} = 1,75$. So, $F_{count} > F_{table}$.

Referring to the decision making criteria, namely (Sugiyono, 2011):

a. Accept H_o; if $F_{count} \leq F_{table}$, and
b. Reject H_o: if Jika $F_{count} \geq F_{table}$

Because the value of $F_{count} = 4,78 \geq F_{(0,05)(36:36)} = 1,75$ it is concluded that the distribution variation of the two data groups is not humogeneous at the confidence level $\alpha = 0,05$.

The value of t count = 7.05 and the value of t table = 1.68 with a significant level of α = 0.05; dk = 37. Because tcount> ttable, then H0 is rejected and Ha is accepted. Thus, based

on the results of this study, it was decided that the learning achievement of Physics Materials from students of the Department of Physics Education, FKIP Unsyiah at college was significantly better than during high school. The probability of correctness of this decision is 95% and the probability of an error being made is 5%.

Judging from cognitive maturity, students of the Department of Physics Education, FKIP Unsyiah when they were at the education level in Senior High School and Higher Education were in the same category, namely the early adult stage. Judging from the material and the level of complexity between Physics in Senior High School and Basic Physics 2 college, it is relatively the same. This is because Basic Physics in the Department of Physics Education, FKIP Unsyiah is repeating the high school physics material to strengthen and equalize the basic abilities of students in the early days of their studies. The learning achievements achieved by students of the Department of Physics Education, FKIP Unsyiah class 2018 in the Basic Physics 2 course were better than the learning achievements of Physics material in high school, influenced by other factors that affect learning achievement. Higher academic demands in tertiary institutions cause the responsibility of students to complete their studies to increase (Blascova, 2014). There are relatively many college assignments both independently and in groups at college, causing students to be more serious about learning (Rus et al, 2014). The factors that influence learning cause student achievement in Basic Physics 2 subject to be higher than the achievement of Physics subject in Senior high school.

However, other research results were different. Research results from Marliana (2014), based on the results of a researcher interview with a new student, show that the academic achievement of students tends to be lower than their academic achievement in high school due to differences in learning methods and methods between lectures and Senior High School. Becoming a student is not an easy thing for some teenagers who graduate from high school and continue to tertiary education. Students are required to be able to make adjustments to new situations and demands. If the adjustment made by students is bad with life at the University it may force students to leave the institution (Mudhovozi, 2012). The results of Warsito's (2009) research show that a person who can make academic adjustments well, then the student will be able to achieve high academic achievement. The results of this different research are probably caused by differences in the subject and location of the study and the psychological condition of students who are shaken by differences in the environment and learning system. Students who are unable to adapt to the changing learning environment will experience psychological instability so that they are unable to achieve a new psychological balance (equilibrium) (Magnusson & Zackariasson, 2018).

CONCLUSIONS

From the analysis it can be seen that the results of the hypothesis test obtained are the value of t = 7.05 with a significant level of $\alpha = 0.05$ and t table = 1.68, then the results are rejected H0 and accept Ha because tcount $\geq$ t table. It was concluded, that the learning

achievement of Physics Materials from students of the Department of Physics Education, FKIP Unsyiah when in the college was better than during senior high school.

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Comparison in learning achievement phisics Education students FKIP Unsyiah in Ssenior High School and Higher Education

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Comparison of Learning Achievement Physics Education Students, FKIP-Unsyiah in Senior High School and Higher Education

D Fitriyani Dalimunthe[1], A Farhan[2*], A Wahyuni[2], Evendi[2], Nurulwati[2]

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(Received: October 13, 2020; Accepted: October 14, 2020; Published: October 27, 2020)

ABSTRACT

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The condition of students in terms of age and maturity stage is relatively the same when they are in the Senior high school and university according to Piaget's cognitive theory. However, the obstacles faced in college caused learning achievement could increase compared when they were in high school (Tu'u, 2004). Based on this, it is interesting to examine the comparison of student achievement between high school and higher education, especially in the Department of Physics Education, FKIP - Unsyiah.

Research Focus

This research was conducted to compare the learning achievement of students of the Department of Physics Education, FKIP - Unsyiah while in high school and university.

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$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$$

Keterangan:

t = t value

$\bar{x}_1$ = Average physics grade in senior high school

$\bar{x}_2$ = The average score of physics in Higher Education

S_1^2 = Variance Physics grades in senior high school

S_2^2 = Variance Physics grades in Higher Education

S_1 = Standard Deviation of Physics grades in senior high school

S_2 = Standard Deviation of Physics grades in higher education

n_1 = Number of students for physics grades in senior high school

n_2 = Number of students for physics grades in higher education

RESULTS AND DISCUSSION

The results of this study are described in detail in the recapitulation of the analysis results which are summarized in Table 1:

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No.	Description	SHS	HE
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Comparison of calculated Chi-Square values with table Chi-Square values at α = 0.05, for:

a. Physics score data from the sample at senior high school is 5.94 <11.07, and
b. Basic Physics 2 score data from the sample at higher education is 10.22 <11.07.

Referring to the decision making criteria, namely (Sudjana, 2005):

a. Reject H_0; if $\chi^2_{count} \geq \chi^2_{table}$, and
b. Accept H_0; if $\chi^2_{count} \leq \chi^2_{table}$,

The calculated Chi-Square value for both data groups is smaller than the Chi-Square value of the table. So, the distribution of this research data for the two groups spread normally at a significant level of 0.05 and degrees of freedom 6-1 = 5.

The results of the calculation of the variance equality test obtained $count$= 4,78. The distribution value of F table with a significant level of 5% degrees of freedom (dk) for the numerator = $(n_1 - 1) = 37 - 1 = 36$ and dk denominator = $(n_2 - 1) = 37 - 1 = 36$ obtained F_{table} is $F_{(0,05)(36:36)} = \frac{1,78 + 1,72}{2} = 1,75$. So, $F_{count} > F_{table}$.

Referring to the decision making criteria, namely (Sugiyono, 2011):

a. Accept H_o; if $F_{count} \leq F_{table}$, and
b. Reject H_o: if Jika $F_{count} \geq F_{table}$

Because the value of $F_{count} = 4,78 \geq F_{(0,05)(36:36)} = 1,75$ it is concluded that the distribution variation of the two data groups is not humogeneous at the confidence level $\alpha = 0,05$.

The value of t count = 7.05 and the value of t table = 1.68 with a significant level of α = 0.05; dk = 37. Because tcount> ttable, then H0 is rejected and Ha is accepted. Thus, based

on the results of this study, it was decided that the learning achievement of Physics Materials from students of the Department of Physics Education, FKIP Unsyiah at college was significantly better than during high school. The probability of correctness of this decision is 95% and the probability of an error being made is 5%.

Judging from cognitive maturity, students of the Department of Physics Education, FKIP Unsyiah when they were at the education level in Senior High School and Higher Education were in the same category, namely the early adult stage. Judging from the material and the level of complexity between Physics in Senior High School and Basic Physics 2 college, it is relatively the same. This is because Basic Physics in the Department of Physics Education, FKIP Unsyiah is repeating the high school physics material to strengthen and equalize the basic abilities of students in the early days of their studies. The learning achievements achieved by students of the Department of Physics Education, FKIP Unsyiah class 2018 in the Basic Physics 2 course were better than the learning achievements of Physics material in high school, influenced by other factors that affect learning achievement. Higher academic demands in tertiary institutions cause the responsibility of students to complete their studies to increase (Blascova, 2014). There are relatively many college assignments both independently and in groups at college, causing students to be more serious about learning (Rus et al, 2014). The factors that influence learning cause student achievement in Basic Physics 2 subject to be higher than the achievement of Physics subject in Senior high school.

However, other research results were different. Research results from Marliana (2014), based on the results of a researcher interview with a new student, show that the academic achievement of students tends to be lower than their academic achievement in high school due to differences in learning methods and methods between lectures and Senior High School. Becoming a student is not an easy thing for some teenagers who graduate from high school and continue to tertiary education. Students are required to be able to make adjustments to new situations and demands. If the adjustment made by students is bad with life at the University it may force students to leave the institution (Mudhovozi, 2012). The results of Warsito's (2009) research show that a person who can make academic adjustments well, then the student will be able to achieve high academic achievement. The results of this different research are probably caused by differences in the subject and location of the study and the psychological condition of students who are shaken by differences in the environment and learning system. Students who are unable to adapt to the changing learning environment will experience psychological instability so that they are unable to achieve a new psychological balance (equilibrium) (Magnusson & Zackariasson, 2018).

CONCLUSIONS

From the analysis it can be seen that the results of the hypothesis test obtained are the value of t = 7.05 with a significant level of α = 0.05 and t table = 1.68, then the results are rejected H0 and accept Ha because tcount ≥ t table. It was concluded, that the learning

achievement of Physics Materials from students of the Department of Physics Education, FKIP Unsyiah when in the college was better than during senior high school.

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