Factors That Influence Plumbing Learning Achievement of Grade X Students of Building Drawings Engineering, SMKN 3 Semarang

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Article Info	Abstract
	Learning achievement is one measure of success in teaching and learning. High and low grades achieved by students are influenced by internal and external factors. Internal factors that influence learning achievement are (1) Intelligence; (2) Interests; (3) Talent; and (4) Motivation. Whereas external factors are (1) School environment, and (2) Family environment. The problems examined are what kind of factors that influence and how much these factors affect. The population in this study was grade X students of Building Drawings Engineering of SMKN 3 Semarang. Total population was 71 using a sample of 61 students. The variables examined in this study are (1) Internal factors; (2) External factors; and (3) Learning achievements. Retrieval of data using (1) Observation techniques; (2) Documentation; (3) Questionnaire. Data analysis uses multiple regression analysis. The results of this study state that the factors that influence the plumbing learning achievement of grade X students of Building Drawings Engineering of SMKN 3 Semarang are internal factors consisting of (1) Intelligence; (2) Interests; (3) Talent; (4) Motivation; and (5) External factors which consist of (1) Family environment, and (2) School environment. The amount of influence of the internal and external factors on the plumbing learning achievement of students of Building Drawings Engineering class at SMKN 3 Semarang, partially the amount of the influence of internal factors is 26.9% and external factors is 19.5%. Simultaneously the amount of the influence of internal factors and external factors is 46.6%.

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INTRODUCTION

Education is a planned conscious effort to create an atmosphere of learning and learning process so that students can actively develop their potential to have religious spiritual strength, self-control, personality, intelligence, noble character, and also the skills needed for their own interests and the community's.

Educational path in Indonesia in Law No. 20 of 2003 Article 13 Paragraph 1 stated that the education pathway consists of formal, non-formal, and informal education. While the level of education is the stage of education that is applied based on the level of development of students, the objectives to be achieved and the abilities to be developed. According to Law No. 20 of 2003 Article 14, the levels of formal education are (1) Basic education consisting of: A) Elementary School or *Madrasah Ibtidaiyah (MI)*, and B) Junior High School or *Madrasah Tsanawiyah (MTS)*; (2) Secondary education consists of: A) Senior High School, B) *Madrasah Aliyah (MA),* C) Vocational High School or Vocational *Madrasah Aliyah (MAK)*; (3) Higher education consists of: A) Academy, B) Polytechnic, C) Colleges, D) Institutes, and E) Universities. While the type of education according to the Law. No 20 of 2003 Article 15 covers several education, one of which is vocational education. Vocational Education is secondary education that prepares students to work in certain fields. Vocational education is usually implemented in secondary education, especially in vocational high schools. Vocational High School is an integrated part of the National Education System, which has an important role in preparing and developing Human Resources (HR).

Every year SMKN 3 Semarang participates in Student Competency Competition. This competition competes in various fields. Among other things, the Technology and Industry sector which covers various competitions including (1) Autobody Repair; (2) Brick Laying; and (3) Plumbing. SMKN 3 Semarang is able to gain achievements, especially in the fields of (1) Brick Laying, and (2) Plumbing. In the field of Plumbing, it has won several times in Student Competency Competition at the City, Province and National level. In the most recent Student Competency Competition, SMKN 3 Semarang became the first winner at provincial level and fifth winner at national level.

Achievements gained by students of SMKN 3 Semarang in Plumbing contest certainly are not obtained instantly. This success is a structured process that has been implemented by SMKN 3 Semarang. The academic process that runs on plumbing subjects certainly will determine the achievements of students in the competitions that they follow. The effect of learning styles and forms on learning achievement is as follows: (1) learning styles do not significantly influence learning achievement; (2) the form of teaching has no significant effect on learning achievement; (3) students with different learning styles do not statistically differ significantly in their learning performance based on their form of study. (Cimermanová, 2018).

Based on the various achievements that SMKN 3 Semarang has achieved, we can analyze the factors that influence the learning achievement of plumbing subjects in SMKN 3 Semarang.

METHODS

Survey research asks several respondents about their beliefs, opinions, characteristics, and behaviors that have occurred or are currently happening (Robert M. Groves, 2010), where measurements are made on each variable using scores or numbers which later these numbers will be analyzed statistically so that it can become a data that is more digestible by the readers.

The population in this study is all students of the Building Drawings Engineering program in grade X at SMKN 3 Semarang, which consists of 2 classes that are occupied by a total of about 71 students. While the sample, according to Suharsimi (2006: 131), is "Part or Representative of the Population Under Study". The sampling

technique used in this study is Simple Random Sampling. Simple Random Sampling is done by taking samples from the population by mixing them so that all subjects are considered equal. However, due to various obstacles, the sample taken amounted to 61 students.

This research was conducted at SMKN 3 Semarang. There are 2 variables in this study, they are: (1) Independent variables which include internal and external factors, and (2) Dependent variable, which is the score of students as learning outcomes. The instruments used for obtaining data in this study were (1) Non-test, which is using a questionnaire. The questionnaire was given in the form of a list of questions that already have answer choices so that the respondents only had to give a checklist on the selected answer.

The instrument is determined by the level of validity and reliability. The instrument trials are intended to determine the validity and reliability of the instrument, so that it can be known whether or not the instrument is feasible in research data collection. The research instrument that will be tested is an instrument about the factors that influence the achievement of Plumbing subjects in grade X of Building Drawings Engineering class of SMK Negeri 3 Semarang.

Table 1. Internal Factor Validity Test Results

Variables	Indicators	Valid	Invalid
Internal Factors	Intelligence	2.3	1
	Interest	4.5.6	
	Talent	7.8	9
	Motivation	10.12.13	11

Source : Researcher's Data (2014)

Table 2. External Factor Validity Test Results

Variables	Indicators	Valid	Invalid
External Factors	School Environment		
	Teachers	14.15.16	17
	Tools/Media	18.20	19
	Building Condition	21.23	22
	Curriculum	24.25	26
	Family Environment		
	Parents	27.28.29.30	
	Home Atmosphere	31.32.34	33
	Economic Condition	36.37.38	35

Source : Researcher's Data (2014)

The instrument testing criteria are said to be reliable if the r count is greater than r table at the 5% significance level. The results of the study using the formula above were interpreted with the level of reliability coefficient according to Sugiyono (2010: 184) as follows:

Table 3. Interpretation of Correlation Coefficients

Interval of Coefficients	Interpretation
0.000 – 1.999	Very Low
0.200 – 0.399	Low
0.400 – 0.599	Moderate
0.600 – 0.799	High
0.800 – 1.000	Very High

Source : Sugiyono (2010: 184)

Instrument indicators are said to be reliable if the correlation coefficient is equal to or greater than 0,600. Based on the results of the questionnaire test, the result of all variables is >0.600 with a value of 0.978 so all reliable indicators are used as data collection tools.

The normality test is shown by the points following the diagonal line. Multicollinearity test is shown by looking at the tolerance value and VIF. If the tolerance value is >1 and VIF >10, there will be multicollinearity.

Table 4. Multicollinearity Test Results

Model	t	Sig.	Collinearity Statistic	
			Tolerance	VIF
Internal	4.459	0.000	0.908	1.102
External	3.609	0.001	0.908	1.102

Source : Researcher's Data (2014)

Heteroscedasticity test is shown by looking at the relationship between Regression Studentized Residuals with Regression Standardized Predicted Value.

RESULTS AND DISCUSSION

1. Description of internal factors with learning achievement

Descriptive analysis results on data of the internal factor variable can be seen in the following table:

Table 5. Descriptive Calculation Results of Percentage of Internal Factor Variables

Interval (%)	Frequency	Percentage	Criteria
81.26 < score ≤100	30	49.2	Very high
62.6 < score ≤ 81.25	27	44.3	High
43.76 < score ≤ 62.5	4	6.5	Low
25 < score ≤ 43.75	0	0	Very low
Total	61	100	

Source: Results of Study (2014)

Based on table 5, it can be seen that most students have internal factors in the very high category that is 49.2%. As seen from each indicator, it appears that the highest percentage is the indicator of interest. Interest has a positive effect on learning achievement. The higher the interest of students, the better the learning achievement is, conversely the lower the interest of students, the lower the learning achievement is. Intelligence has a positive effect on learning achievement. The higher the student's intelligence, the better the learning achievement is, conversely the lower the level of intelligence, the lower the learning achievement is. Talent influences learning achievement. The higher the talent of students, the better the achievement of learning is, conversely the lower the talent of students the lower the learning achievement is. Motivation has a positive effect on learning achievement. The higher the motivation of students, the better the learning achievement is, conversely the lower the motivation of students, the lower the learning achievement is.

2. Descriptions between external factors and learning achievement

Descriptive analysis results on data of the external factor variable can be seen in the following table:

Table 6. Descriptive Calculation Results of Percentage of Variables External Factors

Interval	Frequency	Percentage	Criteria
81.26 < score ≤100	27	44.3	Very high
62.6 < score ≤ 81.25	32	52.5	High
43.76 < score ≤ 62.5	2	3.2	Low
25 < score ≤ 43.75	0	0	Very low
Total	61	100	

Source : Results of Study (2014)

Based on table 6, it shows that as many as 27 students with a percentage of 44.3% are with very good external factors or in very high criteria, 32 students included in the high category with a percentage of 52.5%, and 3.2% of students are in the low category. From these data it appears that the majority of students have good external factors. The teacher has a positive effect on learning achievement. The better the teacher's condition, the better the student's learning achievement, conversely the lower the teacher's condition, the lower the learning

achievement. The tools / media available at SMK Negeri 3 Semarang still need improvement, especially the books that accompany and support Plumbing learning. The condition of the building which includes comfort, air circulation, and lighting are in the good category. The curriculum has a positive effect on learning achievement. the better the school curriculum, the better student learning achievement, conversely the lower the quality of the curriculum, the lower the learning achievement. Parents have a positive effect on learning achievement. The better the condition of the parents of students the better the student's learning achievement, conversely the lower or less good condition of the parents, the lower the learning achievement. The atmosphere of the house has a positive effect on learning achievement. The better the atmosphere of the student's home, the better the student's learning achievement, conversely the lower or less good the atmosphere of the home, the lower the learning achievement. The economic condition of the family has a positive effect on learning achievement. The better the economic condition of the student's family, the better the student's learning achievement, conversely the lower or less good the family's economic condition, the lower the learning achievement.

3. Partial relationship between internal and external factors with learning achievement

The amount of partial influence is intended to test the significance of the influence of each variable, it can be presented as follows:

Table 7. Result of T Test.

Variables	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Internal	0.193	0.530	0.377	3.609	0.001
External	0.182	0.410	0.466	4.459	0.000

Source: Result of Study (2014)

Based on the results of the T test, it appears that the internal factor variable (x1) is of 4,459 with a significance of 0,000 <0.05, which means there is a significant influence from the internal factors on student learning achievement. The value for the external factor variable (x2) is 3,609 with a significance of 0.001 <0.05, which means that there is a significant influence from the external factors on student achievement. The amount of the partial effect of each independent variable on the dependent variable can be known from the square of the partial correlation of each variable. Based on the results of the analysis, the partial correlation coefficient for internal factors is 0.642 so r^2 for this variable is 0.269 which means that the amount of the influence of internal factors is 26.9%. The partial correlation for external factors is 0.441 so r^2 for this variable is 0.195 which means that the amount of the influence of external factors is 19.5%.

Table 8. Partial Correlation

Variables	Partial Correlation	ϕ	Explanation
Internal	0.441	0.001	Significant
External	0.642	0.000	Significant

Source : Result of Study (2014)

4. Simultaneous relationship between internal and external factors and learning achievement

The amount of the effect of simultaneous internal and external factor variables on student achievement. Based on the results of the simultaneous test F count is 23,517 with a significance of 0,000 <0.05. Thus it shows that there is a real influence between internal and external factors on student learning achievement. Physiological, psychological, family, school, and community factors (internal and external factors) together (simultaneously) significantly influence economic learning achievement. The Adjusted R Square is 0.690. This means that economic learning achievement (Y) is influenced by these factors (Rachmawati, 2009). The results of the double determination

with an R-square value is 0.466, which means that internal factors and external factors influence student achievement by 46.6% while the rest of student achievement is 53.4% influenced by other factors outside of internal and external factors which is not examined in this study.

Table 9. Simultaneous Relationship

Variables		R (Correlation)	ϕ	Explanation
Independent	Internal	0.441	0.001	
	External	0.642	0.000	
Dependent	Student's Achievements	1.000	0.000	

Source : Result of Study (2014)

CONCLUSION

The relationship between internal factors and learning achievement on students of grade X of Building Drawings Engineering program at SMKN 3 Semarang partially influences by 26.9% with internal factors that have a positive effect on learning achievement consisting of: 1) intelligence; 2) interests; 3) talent; and 4) motivation. The relationship between external factors and learning achievement partially influences by 19.5% with external factors that have a positive effect on learning achievement consisting of: 1) teacher; 2) condition of the building; 3) curriculum; 4) parents; 5) home atmosphere; and 6) economic conditions. Simultaneously the amount of the influence of internal factors and external factors on student achievement is 46.6% while the rest of student achievement is 53.4% influenced by other factors outside of internal and external factors which are not examined in this study.

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