Internal factors that are influencing in determining the selection of expertise programs in vocational high school

Dwi Rahdiyanta (iD), **Khusni Syauqi *** (iD), **Achmad Arifin** (iD)

Universitas Negeri Yogyakarta, Indonesia.

* Corresponding Author. Email: khusnisyauqi@uny.ac.id

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ABSTRACT

This study aims to examine the effect of students' internal factors (information literacy, self-understanding, and attitude) on their decision to enroll in a vocational high school mechanical engineering program. It is ex-post facto correlation research using a sample of 300 out of 1,086 students. The sample was established using the proportional random sampling technique using the Krejcie and Morgan formula. The data were collected using questionnaires, observation sheets, and documents. The findings reveal that (1) there is a significant and positive correlation between the internal factors and the student's decision to enroll in the mechanical engineering program of vocational high school (VHS); (2) all internal factors have a significant effect on both directly and indirectly on the student's preference for mechanical engineering program of VHS.

INTRODUCTION

Based on the National Education System in Indonesia, after students graduate from Junior High School (JHS), they are offered two alternatives to continue to secondary education, namely general secondary education in the form of senior high school (SHS) and vocational secondary education in the form of vocational high school (VHS). SHS prepares students to be able to continue on to higher education, while VHS prepares graduates to be ready to work according to their field of expertise (Minister of National Education Regulation Number 22 the Year 2006 on Standard of Contents).

Junior high school graduates who will continue to VHS need to get serious attention and guidance from parents and teachers so that everything runs smoothly in determining the selection of expertise programs in VHS. This is especially important due to the extensive fields of vocational programs offered in VHS. Based on the vocational program spectrum of secondary vocational education in Indonesia, there are currently nine vocational fields, 46 vocational programs, and 142 vocational competencies (Decree of the Director General of Elementary and Secondary Education, Ministry of Education and Culture, Republic of Indonesia Number: 4678/D/Kep/2016 on 2 September 2016, on Vocational Spectrum of Secondary Vocational Education).

When students are selecting schools for their secondary education, parents and teachers, as well as the students themselves, must pay serious attention to prevent uncertainty among students in

terms of their choice of secondary education. This uncertainty may be caused by: (1) students' inability to decide between the available alternatives, (2) students' lack of interest, and (3) students' lack of confidence (Crites, 1969; Wicaksono et al., 2018). Choosing the wrong secondary education and not by their interests can cause learning activities and school experiences to be unpleasant and stressful for students. Purnamawati et al. (2019) shows that students' lack of interest in this type of education affects their academic performance and behavior to the point that they will skip classes and even drop out of school.

Making choices combines needs, hopes, personal resources, and economic necessities (Robershaw et al., 2022; Vroom & Jago, 1978). Furthermore, that vocational choice is a combination of interests, abilities, values, opportunities, hopes, and realities (Perry & Wallace, 2015). Therefore, JHS should provide the students with sufficient information regarding vocational fields, vocational programs, and vocational competencies offered by VHS. Detailed information on VHS, such as its vision, missions, goals, and available vocational programs, helps parents and students choose the right program they desire (Herrick, 1996).

Wu (2020) asserts that making choices is a complex issue in the vocational development stages. Furthermore, the process of making vocational choices is influenced by the types of personalities. One's personality development is a mental process that results from one's involvement in one's community, both in similarities and differences. London (1973) uses the term "ego identity" to describe one's personality about one's community. Self-identity is constructed through the interaction of biological, psychological, and sociocultural conditions in which a person lives. Therefore, one's vocational choice always considers the clash between life patterns and vocational development structure.

Isaacson (1977) contends that the process of choosing a career or vocational program has four interrelated variables: reality factors, educational process, emotional factors, and personal values. Reality factors are related to one's response toward one's environment, which forces one to decide on one's career. The educational process is associated with the educational quality and quantity that one achieves, enabling one to gain insight into choosing a career. Emotional factors are about personality aspects. Finally, personal values are value aspects attached to a person that influences his or her career choice. Vocational choices are individual psychological awareness of the objective world about the self (Morris & American Heritage, 1982). Moreover, one's vocational development is essentially an interaction between individual behaviors, attitudes, ambitions, values, and social factors in one's surroundings (Heinz, 2009). Thus, vocational choices are one's psychological process to find the right attitude toward a particular object.

One's character or personality influences one in facing various vocational and career choices offered in one's communities (Holland, 1997). It means that one will choose a career based on one's personality. According to Holland's theory, people will be inward-looking (self-understanding) to assess whether a particular career suits their personality. Thus, self-knowledge is one of the most influential factors in vocational choices. Meanwhile, Vroom and Jago (1978) says that people will make particular vocational choices if they are sure and hopeful that their chosen career will make them successful. Therefore, they will put more effort into achieving the career they desire.

In choosing a vocational program in VHS, JHS graduates encounter some problems. For example, (1) they do not fully understand the details of each program offered in VHS, (2) they lack sufficient understanding of the world of work associated with those programs, (3) they do not know the requirements they have to fulfill for each program, both the cognitive and physical ones, (4) most JHS students have insufficient access to information technology, so they have problems in keeping up with the development of technology and employment related to those vocational programs, and (5) their self-understanding is not good enough to be able to choose the right program for them.

Given the wide spectrum of vocational programs available in VHS, this research focuses on JHS students' preference for the mechanical engineering program at VHS. The determinant factors in this preference are limited to the students' internal factors, namely information literacy, self-understanding, and attitudes toward the mechanical engineering program. Information literacy, self-understanding, and attitudes play an important role in determining the choice of areas of expertise in VHS for junior high school graduates. Therefore, junior high school students must always be

encouraged to increase their capacity, especially those related to developing information literacy, self-understanding, and a positive attitude toward VHS.

This research examines: (1) the description of psychological factors (self-understanding, information literacy, and attitude) regarding the decision of JHS students in Indonesia, especially in the Yogyakarta Special Region, to enroll in the mechanical engineering program in VHS, and (2) the effects of their internal factors of self-understanding, information literacy, and attitude on their preference for a mechanical engineering program in VHS.

RESEARCH METHOD

This correlation research aimed to formulate factors influencing JHS graduates in Yogyakarta Special Region to enroll in the mechanical engineering program at VHS. The research population comprised 1,086 JHS graduates who recently enrolled at VHS, majoring in mechanical engineering in Yogyakarta Special Region, Indonesia. Using Krejcie and Morgan's sampling formula (Isaacson, 1977), i.e., a 5% margin of error is acceptable, a sample of 285 students was established using the proportional random sampling technique. To anticipate any questionnaires and data that could not be processed, the number of samples was added by 5%. Thus, the minimum sample used in this study was as many as: 285 + (5% x 285) = 300 students.

The data were collected using surveys, questionnaires, observation sheets, and documents. The validity of the instruments was measured through expert judgment using the Delphi technique (content validity) and confirmatory factor analysis (construct validity) to find out whether the instrument items were suitable for estimating the components involved in the designated constructs (Ary et al., 2010). Meanwhile, the instrument reliability was calculated using Cronbach's alpha (Fernandes, 1984). The results of the instrument reliability test for information literacy, self-knowledge, attitudes, and the decision to enroll in the mechanical engineering program were 0.88, 0.79, 0.91, and 0.93, respectively. Thus, the proposed research instruments could be used for data collection.

The data were then analyzed using descriptive and inferential analyses (hypothesis tests), including correlation analysis, regression, and path analysis by testing the statistical assumptions (normality, linearity, homoscedasticity, and multi-collinearity). The data analysis requirements test results can be seen in Table 1, Table 2, Table 3, and Table 4.

Table 1. Normality Test Results

No.	Variables	Score Distribution		Skewness
		Histogram	Normal Probability Plot	
1	X_1			0,30
2	X_2	Close to normal curve	Allow the direction of the diagonal line	-0,185
3	X_3			-0,360
4	X_4			-0,120

Based on Table 1, it can be concluded that the residual distribution of all variables in this study meets the normality requirements.

Table 2. Linearity Test Results

Variable	Linearity				Dev. Fro Linearity			
	$F_{calculation}$	F_{table}	p	Conclusion	$F_{calculation}$	F_{table}	p	Conclusion
X_1-Y	24,125	3,88	0,00	Significant	0,955	1,50	0,543	Linear
X_2-Y	47,566	3,88	0,00	Significant	0,940	1,44	0,580	Linear
X_3-Y	122,331	3,88	0,00	Significant	0,724	1,50	0,863	Linear
X_1-X_3	16,763	3,88	0,00	Significant	1,010	1,50	0,458	Linear
X_2-X_3	58,333	3,88	0,00	Significant	1,153	1,44	0,254	Linear

Table 3. Homoscedasticity Test Results

Regression Pairs		Scatterplot		Test Park		
Independent Variable	Dependent Variable	Score Distribution	Conclusion	F	*Sig.*	Conclusion
LnX_1, LnX_2,	$LnRES^2X_3$	Does not form a specific pattern (spread randomly around the zeros on the Y axis)	Homoscedasticity	0,940	0,421	Homoscedasticity
LnX_1, LnX_2, LnX_3	$LnRES^2Y$		Homoscedasticity	1,207	0,307	Homoscedasticity

Based on Table 3, the regression equations specified in this study meet the requirements of homoscedasticity.

Table 4. Multicolinearity Test Results

r product moment between independent variables		Regression Pair		Tolerance		VIF	
Lowest	Highest	Independent variables	Dependent variables	Lowest	Highest	Lowest	Highest
0,231	0,636	X_1,X_2	X_3	0,759	0,897	1,115	1,317
		X_1,X_2,X_3	Y	0,759	0,897	1,115	1,317

Based on Table 4, it can be concluded that there is no evidence of serious multicollinearity between the independent variables. The inter-variable correlation of this study is presented in the Figure 1.
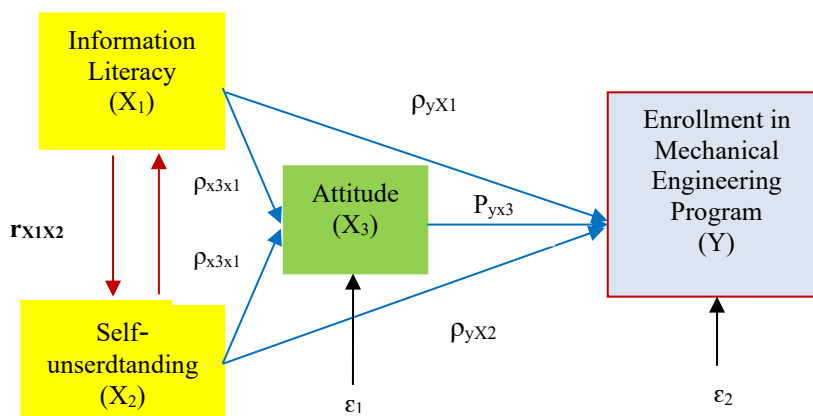

Figure 1. Inter-Variable Correlation

RESULT AND DISCUSSION

Result

The data in this study are summarized in the presentations of frequency distribution, central tendencies (mean, mode, median), as well as measures of dispersion (standard deviation), and the descriptive interpretation of four variables, namely information literacy (X_1), self-understanding (X_2), attitude (X_3), and decision to enroll in the mechanical engineering program at VHS (Y). The analysis result is presented in Table 5. The descriptive analysis reveals that the empirical mean value (M) is higher than the criteria mean value (Mi). Table 5 also shows that the gained value for all variables is above 70%. Thus, it can be generally said that all variables in this study are classified in the "high" category.

Table 5. Descriptive Analysis Result

Var.	SD.	Mi	M	Me	Mo	M : Mi	Value (%)	Category
X1	9.67	78	95.66	95.00	96.00	Higher	73.5	High
X2	5.41	33	44.03	44.00	44.00	Higher	80.3	High
X3	7.16	54	75.29	75.00	72.00	Higher	83.6	High
Y	6.92	51	69.22	69.00	70.00	Higher	81.0	High

Inter-Variable Correlation

The correlation or relationship among variables can be explained by testing the hypothesis: There is a significant relationship among all variables, namely information literacy (X_1), self-understanding (X_2), attitude (X_3), and preference for the mechanical engineering program at VHS (Y). A null correlation analysis with Pearson's product moment was conducted to test the hypothesis. The test results, as seen in Table 6, confirm that the hypothesis is accepted at the significance level of 0.05.

Table 6. The Inter-Variables' Null Correlation Analysis

		X_1	X_2	X_3	Y
X_1	Pearson Correlation	1	.582	.448	.545
	Sig.	.000	.000	.000	.000
X_2	Pearson Correlation	.582	1	.535	.515
	Sig.	.000	.000	.000	.000
X_3	Pearson Correlation	.448	.535	1	.651
	Sig.	.000	.000	.000	.000
Y	Pearson Correlation	.545	.515	.651	1
	Sig.	.000	.000	.000	.000

The Effect of Information Literacy (X_1) and Self-understanding (X_2) on Students' Attitude Toward VHS (X_3)

The effect of information literacy and self-understanding on students' attitudes toward VHS can be determined by testing the hypothesis: There is a significant effect of information literacy (X_1) and self-understanding (X_2) on students' attitudes toward VHS (X_3). The multiple regression analysis was used to test the hypothesis, where X_3 was the dependent variable, while X_1 and X_2 were the independent variables. The analysis result is presented in Table 7.

Table 7. The Multiple Regression Analysis Result of X3 on X1 and X2

Variable		B	Beta	r_{par}	Det. Parsial (r^2_{par})	T_{table}	Sig. t
Dependent	Independent						
X_3	X_1	0.225	0.305	0.267	0.071	4.743	0.000
R = 0.695							
R^2= 0.483							
F = 55.000	X_2	0.572	0.433	0.423	0.179	4.994	0.000
P < 0.05							
C = 25.13							

The result of the multiple regression analysis (Table 7) shows that Fcal = 55.00 and p < 0.05; thus, the correlation coefficient (R) of 0.695 is significant at the significance level of 0.05. This affirms that the hypothesis that there is a significant effect of information literacy (X_1) and self-understanding (X_2) on students' attitudes toward VHS (X_3) is accepted. The coefficient of determination (R^2) of 0.483 shows that the contribution of the two variables is 48.3%.

The Effect of Information Literacy (X1), Self-understanding (X2), and Students' Attitude Toward VHS (X3) on Their Preference for Mechanical Engineering Program at VHS (Y)

The tested hypothesis is There is a significant effect of information literacy (X_1), self-understanding (X_2), and students' attitude toward VHS (X_3) on their preference for the mechanical

engineering program at VHS (Y). Multiple regression analysis was used to test the hypothesis, where Y was the dependent variable, while X_1, X_2, and X_3 were the independent variables. The summary of the multiple regression analysis result is presented in Table 8.

Table 8. The Multiple Regression Analysis Result of Y on X_1, X_2, and X_3

Variable		B	Beta	r_{par}	Det. Parsial (r^2_{par})	t_{cal}	Sig. t
Dependent	Independent						
Y	X_1	0.019	0.057	0.075	0.006	0.722	0.026
R = 0.733							
R^2= 0.538	X_2	0.284	0.222	0.223	0.050	3.992	0.000
F = 56.816							
P < 0.05	X_3	0.366	0.378	0.371	0.138	6.844	0.000
C = 12.199							

The results of the multiple regression analysis, as shown in Table 8, show that F_{cal}= 56.815 and $p < 0.05$, indicating that the correlation value (R) of 0.538 is significant at the significance level of 0.05. Based on the results of the research, the research hypothesis, which states that information literacy (X_1), self-understanding (X_2), and attitudes toward VHS (X_3) significantly affect their choice of mechanical engineering program in VHS (Y), is accepted. Furthermore, the coefficient of determination value (R^2) of 0.538 shows that X_1, X_2, and X_3 contribute 53.8% of the variation in Y.

In detail, information literacy (X_1) has a significant effect on the student's preference for a mechanical engineering program in VHS with $\beta = 0.057$ and $p > 0.05$, so does self-understanding (X_2) with $\beta = 0.222$ and $p < 0.05$ and attitudes towards VHS (X_3) with $\beta = 0.378$ and $p < 0.05$. Based on the coefficient of partial determination, students' attitude toward VHS is the most influential factor affecting their choice of mechanical engineering program in VHS (13.8%), followed by self-understanding (5%) and information literacy (0.6%). Therefore, an attitude has a more dominant role in enrolling in the mechanical engineering program at VHS.

Based on the predictor value and the constant of multiple regression results, the multiple regression equation is $Y = 12.199 + 0.019 X_1 + 0.284X_2 + 0.366X_3$. This equation indicates that the average value of Y (the students' decision to enroll in the mechanical engineering program in VHS) will increase or decrease by 0.019, 0.284, and 0.366 for each increase or decrease in information literacy (X_1), self-understanding (X_2), and attitude toward VHS (X_3) respectively by one unit. An empirical causal relationship model containing the regression coefficient (β) or path coefficient is presented in Figure 2.
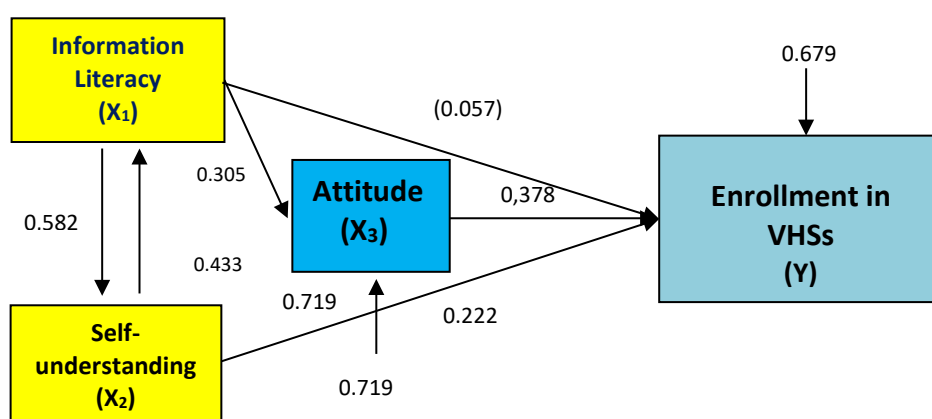

Figure 2. An Empirical Casual Relationship Model

Path Analysis (Direct and Indirect Effects)

The direct and indirect effects are examined by testing the significance of the path coefficient based on the empirical causal relationship model. A coefficient of less than 0.05 is insignificant and excluded from the model. The direct effect can be determined from the beta coefficients of two regression analyses using the stepwise methods, namely (1) a multiple regression of X_3 on X_1 and X_2

and (2) a multiple regression of Y on X_1, X_2, and X_3. However, the indirect effects are calculated manually based on the direct path coefficient in the causal relationship model. The summary of the direct, indirect, and non-causal relationships of the above causal relationship model is presented in Table 9.

Table 9. Path Analysis Results

Variable		Direct Effect	Direct Effect on X_3	Total Effect	Non-Casual Effect	Correlation
Dependent	Independent					
X_3	X1	0,305	-	0,305	0,124	0,448
	X2	0,433	-	0,433	0,206	0,535
Y	X1	0,057	0,040	0,040	0,234	0,545
	X2	0,225	0,162	0,162	0,210	0,515
	X3	0,378	-	0,378	0,409	0,651

Based on the results of the direct and indirect effect analysis, the data show the following: (1) The direct effect of the students' information literacy on their preference for the mechanical engineering program in VHS is significant, and so is the indirect effect of the students' attitudes; and (2) The direct effect of the students' self-understanding on their preference for mechanical engineering programs in VHS is significant, and the indirect effect of the students' attitudes. Based on the path analysis results above, it can be concluded that the student's information literacy, self-understanding, and attitude toward VHS play a significant role in their choice of mechanical engineering as their major in VHS.

Discussion

This study successfully reveals that the relationship among the researched variables is in "moderately strong" criteria. The lowest correlation value is on the relationship between information literacy and the students' attitudes (r = 0.448). Meanwhile, the highest one is on the relationship between the student's attitude and their preference for the mechanical engineering program (r = 0.651), indicating that their attitude strongly affects their enrollment in the mechanical engineering program at VHS. This is consistent with the research findings of Zirkle (2004), affirming that there is a positive relationship between attitudes, motivation, and the choice of vocational programs. Therefore, positive attitudes toward VHS must be developed by improving the quality of the VHS learning process, output, and outcome to promote VHS's positive image.

The multiple regression analysis results show that information literacy, self-knowledge, and the students' attitude positively and significantly affect their preference for the mechanical engineering program at VHS. Furthermore, each aspect significantly impacts the students' choice to major in mechanical engineering. The significant effects of information literacy on the program the students prefer to show that the findings of this research are correspondingly similar with that of Parkinson et al. (1998), confirming that information literacy on sciences and technologies affects one's orientation regarding their preferred vocational program.

Furthermore, this study's results are from the previous study carried out by Perry and Wallace (2015), who found that information literacy on employment contributes 74.4% to third-grade students' interest in enrolling in VHS. Similarly, Rahdiyanta et al. (2020) and Ali dan Asrori (2006) suggested that information literacy, self-understanding, and attitude influence and determine one's decision on what vocational program to choose. JHS graduates' lack of insight into the world of work affects their choice of secondary school. Accordingly, Munadi (2005) confirmed that JHS graduates' lack of perception and poor attitudes toward VHS results from their self-understanding inadequacy which eventually will influence their accuracy in deciding what vocational program to enroll in.

The path analysis results show that the direct effect of information literacy on preference for mechanical engineering programs in VHS is significant, and so is the indirect effect of the students' attitudes. This result indicates that the student's attitude plays a role in explaining the effect of information literacy on the vocational program they choose. Furthermore, it is in line with the

findings of Hirschi (2011), showing that the JHS students' information literacy regarding VHS will affect their perception and attitude toward VHS, which eventually will significantly affect their vocational decision.

Therefore, information literacy is a crucial factor influencing the decision-making process. In other words, JHS graduates who are information literate will have better and more accurate considerations in choosing the vocational program that fits them well. At the same time, information literacy is influenced by some situational factors from school, family, and society. If the situational factor is good, how will the students' information literacy be? This will eventually shape a better insight into VHS, science and technology development, and the world of work associated with the mechanical engineering program.

Besides, the result of the path analysis shows that the direct effect of the students' self-understanding on their preference for the mechanical engineering program in VHS is significant, and likewise, the indirect effect of the students' attitudes. This implies that students' attitude is crucial in explaining the effect of self-knowledge on the students' vocational decision-making. It agrees with Mifflen and Mifflen (1986) that self-concept or self-understanding has a dominant role in developing children's characteristics and behavior. Thus, self-knowledge is an essential psychological activity in taking action. Those who know their potential well have better orientation in deciding what vocational program or career they want to pursue. It is very reasonable since every vocational program or career has specific characteristics and requirements and intrinsic and extrinsic impacts.

In addition, the results of the path analysis revealed that students' attitude toward VHS significantly and strongly affects their preferred vocational program. This is in line with the previous study by Bello et al. (2017) and Rahdiyanta et al. (2020), who claimed that attitude is one of the psychological aspects of individuals, which is crucial because a person tends to behave so that it will affect a lot of one's behaviors. Attitude is a tendency to react to people, institutions, or events either positively or negatively.

Furthermore, according to the theory of determinism, human attitudes are derived or influenced by genetic determinism, psychic determinism, and environmental determinism. Genetic determinism holds that an individual's attitude is affected by that of his/her grandparents. Psychic determinism claims that one's behavior is affected by his/her parents' treatment, parenting, or education. Environmental determinism assumes that the development of a person's attitude is strongly affected by the environment in which the individual lives and how the environment treats him/her. Similarly, according to Thompson (1973), a person's vocational program is affected by either internal or psychological aspects.

The findings of this study show that all parties, including the students themselves, parents, and teachers, must pay serious attention when deciding on the right type of secondary school. It is particularly important to ensure that their targeted secondary school program is clear. These uncertainties may be attributed to (1) the inability to choose one of the alternatives, (2) a lack of interest and talent, and (3) hesitation due to the lack of self-confidence (Crites, 1969). Failure to choose a secondary school that fits one's ability and interest may have detrimental impacts. For example, this wrong choice may create an unpleasant, torturous, and stressful condition in teaching and learning.

CONCLUSION

There is a positive and significant relationship between information literacy, self-understanding, and student attitudes toward the determination of the field of mechanical engineering expertise in VHS. The relationship between these variables is categorized as "strong." The lowest correlation coefficient is found in the relationship between the family environment and attitude ($r = 0.448$; $p < 0.05$). While the highest correlation coefficient is found in the relationship between attitudes and participation in the mechanical engineering study program at VHS ($r = 0.651$). Information literacy, self-understanding, and attitude positively and significantly impact the students' decision to enroll in the mechanical engineering program at VHS (53.8%). Based on the coefficient of partial determination, the student's attitude is the most influential variable affecting their choice

of the mechanical engineering program in VHS (13.8%), followed by self-understanding (5%) and information literacy (4.6%).

Information literacy, self-understanding, and attitude have a positive and significant effect either directly or indirectly on their decision to enroll in the mechanical engineering program at VHS. Information literacy, self-understanding, and attitudes play an important role in determining the choice of areas of expertise in VHS for junior high school graduates. Therefore, junior high school students must always be encouraged to increase their capacity, especially those related to the development of information literacy, self-understanding, and a positive attitude toward SMK. Junior high school teachers must provide various media access to information about SMK and provide more intensive vocational training as early as possible to their students..

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