Kinesthetic intelligence in welding practice lectures

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Kinesthetic intelligence in welding practice lectures

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Abstract. This study aims to determine the student's kinesthetic intelligence, the level of student's kinesthetic intelligence and to measure the relationship between kinesthetic intelligence and the learning outcomes of welding practice lectures in the Undergraduate Program of Mechanical Engineering Education, Faculty of Engineering, Yogyakarta State University. The method used is a survey. The research was carried out in the Undergraduate Program of Mechanical Engineering Education, Faculty of Engineering, Yogyakarta State University. The research was conducted from April to July 2020. The research subjects were students of the 2018 batch of Undergraduate Program of Mechanical Engineering Education, Faculty of Engineering, Yogyakarta State University. The research variables are students' linguistic intelligence (independent) and the learning outcomes of welding practice lectures (dependent). The results showed that the students' verbal-linguistic intelligence was 72.02%. 6.49% or as many as 5 students make kinesthetic intelligence the highest value compared to other intelligence. The significance value (Sig.) Is 0.416 and greater than 0.05, so it can be concluded that Ha is rejected, and H0 is accepted with kinesthetic intelligence that does not have a significant effect on the learning outcomes of students in the Undergraduate Program of Mechanical Engineering Education, Faculty of Engineering, Yogyakarta State University. The value of R Square is 0.011, which means that the influence of kinesthetic intelligence possessed by students (X) on learning outcomes of welding practice students of the Undergraduate Program of Mechanical Engineering Education, Faculty of Engineering, Yogyakarta State University (Y) is only 1.1% while 98.9% is influenced by other variables.

1. Introduction

Current technology has become a strong foundation for Indonesia to compete in the implementation of the 4.0 industrial revolution era. Technology has entered every aspect of supporting people's lives, one of which is the aspect of education. Education is one of the front lines for developing human resources with various integrations of methods including training, workshops, and education. This is so that human resources can develop and compete with other human resource developments in the current era.

Education as public awareness in a planned and active manner to realize the development of self-potential in a spiritual, religious manner, self-control, personality, intelligence, morals, and competencies needed by themselves, the wider community, and even the nation and state. Education also stimulates an increase in a person's hard and soft skills. Hard skills are manifested in the form of student competencies in the process of skills according to expertise, while soft skills are manifested in the form of skills and proficiency in self-management to be more developed and competent [6]. Learning soft skills will shape someone to have good quality competence and according to the needs for competition. The formation of good self-competence is not easy, it requires a learning process that supports both adaptively, normatively, and productively [6]. The implementation of learning is carried out with a concept that is by educational goals such as the learning process through the role of parents as main educators in informal education, the role of educators as educators informal education, and the community as educators in non-formal education.

The purpose of the learning process carried out is to develop self-potential and competence with various developments as a result of implementing all the processes that have been passed. This kind of

learning process is not shared by many universities in Indonesia because of the lack of lecturers in exploring the potential of students optimally, some even do not know how this potential is owned and developed.

One of the potential intelligence that can be developed is kinesthetic intelligence. Kinesthetic intelligence is one of the multiple intelligences that are related to skills in controlling the coordination of body movements through gross and fine motor movements, such as coordination, balance, strength, flexibility, and speed.

Body movements require precise coordination between muscles, nerves, and senses. This perception is what makes kinesthetic intelligence an ability to move parts of the body or the whole body in carrying out muscle movements that refer to the senses in the muscles. All coordination abilities are greatly influenced by the level of sensitivity of the limbs by integrating them using the senses contained in muscles [4].

Students with high kinesthetic intelligence will be able to perform movements well, quickly, and flexibly. This is expected to make an important contribution to welding practice lectures. Lecturers must understand the concept of kinesthetic intelligence possessed by students because this intelligence is believed to be one of the important elements determining the success of student learning in welding practice lectures. However, the kinesthetic intelligence possessed by each student is not the same, but there are different levels for each individual, some at high, medium, and low-grade levels.

Based on this, kinesthetic intelligence has an important role in determining the results of learning welding practice lectures that have been passed by students. This needs to be developed so that the objectives of the teaching and learning process can be realized, assisted by information about the kinesthetic intelligence profile, and a preliminary study to determine the level of the kinesthetic intelligence profile of students.

2.   Method

This study used a survey method with a quantitative approach to measure the level of the relationship between students' kinesthetic intelligence and learning outcomes in welding practice lectures. Surveys are used to collect data at certain points/sections that aim to describe the situation or identify standards between subjects being compared. Surveys can also be used to determine the relationship between variables [5]. This research was conducted in the Undergraduate Program of Mechanical Engineering Education, Faculty of Engineering, Yogyakarta State University in the range of April to July 2020. The population used was students of the Undergraduate Program of Mechanical Engineering Education, Faculty of Engineering, Yogyakarta State University with the research sample being students of the 2018 Undergraduate Program of Mechanical Engineering Education, Faculty of Engineering, Yogyakarta State University.

The independent variable is the variable that affects, and the dependent variable is the variable that is influenced by and in the study [5]. Student kinesthetic intelligence as the independent variable and the learning outcome variable in welding practice lectures as the dependent variable. Methods of data collection using questionnaires and documentation.

Validity is a measure that shows the levels of validity or validity of an instrument [1]. This research uses logical validity and empirical validity. The validity of this study uses logical validity and empirical validity. Logical validity was carried out by expert judgment from 2 psychology lecturers. Empirical validity is done by testing the instrument directly on the respondent. The results of the t-test were analyzed using product-moment correlation using the SPSS 19 for windows computer program, with the results could be seen in table 1.

Table 1. Validity test results

Point	t count	t table	Description	Point	t count	t table	Description
Point 1	0,474	0,266	VALID	Point 7	0,525	0,266	VALID
Point 2	0,389	0,266	VALID	Point 8	0,512	0,266	VALID
Point 3	0,105	0,266	INVALID	Point 9	0,514	0,266	VALID
Point 4	0,519	0,266	VALID	Point 10	0,477	0,266	VALID
Point 5	0,115	0,266	INVALID	Point 11	0,259	0,266	INVALID
Point 6	0,379	0,266	VALID				

There are 8 valid items and 3 invalid items. Reliability shows that an instrument can be trusted to be used as a data collection tool [1]. The reliability is calculated using the help of the SPSS 19 for windows computer program, the criteria used in this test are if ($\alpha = 5\%$). The results could be seen in table 2 and table 3.

Table 2. Case processing summary results

		N	%
Cases	Valid	64	100.0
	Excluded[a]	0	.0
	Total	64	100.0

a. Listwise deletion based on all variables in the procedure.

Table 3. Results of the reliability statistics

Cronbach's Alpha	N of Items
.738	11

The questionnaire's reliability coefficient was 0.738 with a high level of reliability. This value r count> r table (0.738> 0.244), thus it can be concluded that the kinesthetic intelligence research questionnaire of students of the Undergraduate Program of Mechanical Engineering Education, Faculty of Engineering, Yogyakarta State University is reliable and can be trusted for research. The research analysis used simple linear regression because the variables involved in this study were students' verbal-linguistic intelligence as an independent variable (X) and learning outcomes in welding practice lectures as the dependent variable (Y). In the process of simple linear regression analysis, researchers used the help of the SPSS 19 for windows program. Testing for normality is assisted by the SPSS 19 for windows computer program with the results summarized in table 4.

Table 4. Results of the One-Sample Kolmogorov-Smirnov Test

		Unstandardized Residual
N		64
Normal Parameters[,b]	Mean	.0000000
	Std. Deviation	6.10490607
Most Extreme Differences	Absolute	.142
	Positive	.103
	Negative	-.142
Kolmogorov-Smirnov Z		1.138
Asymp. Sig. (2-tailed)		.150

a. Test distribution is Normal.

b. Calculated from data.

Based on the SPSS output table above, the Asymp value is obtained. Sig. (2-tailed) is 0.150. This value is greater than 0.05 (0.150> 0.05) so that by the basis for decision making in the Kolmogorov-Smirnov normality test, it can be concluded that the data is normally distributed, thus that the

assumptions or normality requirements in the regression model have been met. This linearity test uses the help of the SPSS 19 for windows computer program with the results summarized in table 5. Deviation from Linearity Sig. is 0.329 and the value is 0.329> 0.05, so there is a significant linear relationship between the independent variable and the dependent variable.

Table 5. ANOVA table results

			Sum of Squares	df	Mean Square	F	Sig.
SMAW Welding Practices * Kinesthetic Intelligence	Between Groups	(Combined)	522.701	12	43.558	1.185	.318
		Linearity	48.607	1	48.607	1.323	.255
		Deviation from Linearity	474.094	11	43.099	1.173	.329
	Within Groups		1873.908	51	36.743		
	Total		2396.609	63			

3. **Result and Discussion**

The results of filling out the verbal-linguistic intelligence questionnaire by the students were then carried out recap, analysis, and calculations with the help of using SPSS 19 for windows with the average percentage result of 72.02%. This calculation is assisted by using SPSS 19 for windows summarized in table 6. The results of the SPSS output above are then made in the form of a diagram depicted in figure 1. It could be seen that 36 students (56.3%) owned the medium category and 28 students (43.8%) in the high category.

Table 6. Kinesthetic Categories

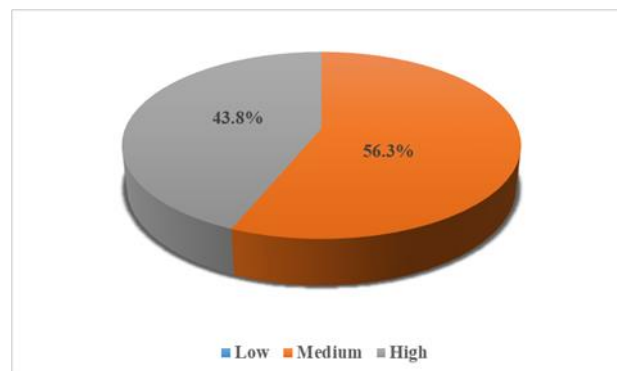|		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Medium	36	56.3	56.3	56.3
	High	28	43.8	43.8	100.0
	Total	64	100.0	100.0	

Figure 1. Kinesthetic category percentage diagram

Regression Coefficient Test

Testing the regression coefficient hypothesis uses the help of the SPSS 19 for windows computer program summarized in table 7 and 8.

Table 7. ANOVA[b] results

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	21.333	1	21.333	.670	.416[a]
	Residual	1975.252	62	31.859		
	Total	1996.585	63			

a. Predictors: (Constant), Kinesthetic Category
b. Dependent Variable: SMAW Welding Practices

Table 8. Coefficients results

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	79.801	4.361		18.298	.000
	Kinesthetic Intelligence	.125	.153	.103	.818	.416

a. Dependent Variable: SMAW Welding Practices

The simple linear regression equation is Y = 79,801 + 0.125X. This means that if there is no kinesthetic intelligence (X), then the consistent value of learning outcomes in welding practice lectures (Y) is 79,801, while for each 1% addition the level of kinesthetic intelligence (X) will have an impact on an increase of 0.125 in learning outcomes of welding practice lectures (Y).

The significance value (Sig.) Is 0.416 and greater than 0.05, so it can be concluded that Ha is rejected and H0 is accepted in the absence of significant regression effect on kinesthetic intelligence possessed by students of Undergraduate Program of Mechanical Engineering Education, Faculty of Engineering, Yogyakarta State University (X) on learning outcomes of welding practice student of Undergraduate Program of Mechanical Engineering Education, Faculty of Engineering, Yogyakarta State University (Y).

Table 9. Model summary results

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.103[a]	.011	-.005	5.64437

a. Predictors: (Constant), Kinesthetic Intelligence

The model summary result is summarized in table 9. The value of R Square is 0.011, which means that the influence of kinesthetic intelligence possessed by students (X) on learning outcomes of welding practice students of the Undergraduate Program of Mechanical Engineering Education, Faculty of Engineering, Yogyakarta State University (Y) is only 1.1% while 98.9% is influenced by other variables.

Kinesthetic intelligence is one part of multiple intelligences or multiple intelligences possessed by each student. This intelligence is related to the motor ability and balance possessed by a person. The kinesthetic intelligence possessed by students makes them able to optimize the use of body language when expressing their ideas and feelings. Can also use his hands to produce or transform something. This intelligence is shown by the ability of sees people to build important relationships between the mind and the body, which allows the body to manipulate objects or create movement. This is reinforced by the statement that kinesthetic intelligence is the intelligence of the whole body. This intelligence enables us to control and interpret body movements, regulate physical objects, and establish a balance between body and soul [2]. Students with this intelligence have physical skills such as balance, flexibility, strength, agility speed, and coordination of either part of their body or all of their limbs.

Kinesthetic intelligence in the world of education and learning is not unlearnable but can be learned and trained on students. The strategies used to develop kinesthetic intelligence by students in the learning process are 1) taking a walk while reading or listening; 2) Make notes on homemade index cards; 3) write what you want to write; 4) Learning in a group; 5) Check again regarding the work that has been done and; 6) Re-read what has been written [3].

Kinesthetic intelligence in the context of welding practice lectures includes the ability of students to actively use their limbs to carry out welding practices and solve various problems they face. Therefore, this intelligence is useful for increasing practical support abilities such as psychomotor, social, sportsmanship, building self-confidence, and increasing strength and health.

Based on the results of the above research, the kinesthetic intelligence possessed by students has a good average percentage of 72.02%, which means that students have good abilities in terms of using body language and expressing all their ideas. Kinesthetic intelligence is divided into 3 categories, namely low, medium, and high, the results are the moderate category of 36 students (56.3%) and high category of 28 students (43.8%). This explains that the students as a whole are on a good track and position because the whole is in the medium and high categories, they do not have students with low categories of kinesthetic intelligence.

However, it turns out that kinesthetic intelligence does not have a significant effect on the learning outcomes of students in the Undergraduate Program of Mechanical Engineering Education, Faculty of Engineering, Yogyakarta State University, because the calculation is that the significance value (Sig.) Is 0.416 and is greater than 0.05, so it can be concluded that Ha is rejected and H0 received. The value of R Square is 0.011, which means that the influence of kinesthetic intelligence possessed by students (X) on learning outcomes of welding practice students of the Undergraduate Program of Mechanical Engineering Education, Faculty of Engineering, Yogyakarta State University (Y) is only 1.1% while 98.9% is influenced by other variables.

Based on the data above, kinesthetic intelligence is very minimal in giving an effect on student learning outcomes of welding practice. Students' kinesthetic abilities are not in line with the technical skills needed in the practical lecture process. This is because in the implementation of welding practice lectures, not only the use of body parts is required to support the implementation of welding practice, but the integration with the use of focus and concentration and good thinking so that it will produce soft skills and hard skills that can provide an assessment of the condition of students in practical lectures carried out.

4. Conclusion

Based on the results of the research and description above, it can be concluded that

a. Kinesthetic intelligence possessed by students has a good average percentage of 72.02%, which means that students have good abilities in terms of using body language and expressing all their ideas.

b. Kinesthetic intelligence is divided into 3 categories, namely low, medium, and high, the results are the moderate category of 36 students (56.3%) and high category of 28 students (43.8%). This explains that the overall students are on a good track and position because the whole is in the medium and high categories, they do not have students with low categories of kinesthetic intelligence.

c. The significance value (Sig.) Is 0.416 and greater than 0.05, so it can be concluded that Ha is rejected, and H0 is accepted with kinesthetic intelligence that does not have a significant effect on the learning outcomes of students in the Undergraduate Program of Mechanical Engineering Education, Faculty of Engineering, Yogyakarta State University. The value of R Square is 0.011, which means that the influence of kinesthetic intelligence possessed by students (X) on learning outcomes of welding practice students of the Undergraduate Program of Mechanical Engineering Education, Faculty of Engineering, Yogyakarta State University (Y) is only 1.1% while 98.9% is influenced by other variables.

Students of the Mechanical Engineering Education study program, Faculty of Engineering, Yogyakarta State University, and d) Research implementation team.

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