

## Contribution of communication skills and technological innovation capability to vocational skills in Era 4.0

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### Abstract

The purpose of this study is to determine the relationship of communication skill ( $X_1$ ) and technological innovation capability ( $X_2$ ) to vocational skill in era 4.0 ( $Y$ ) in VHS students competency industrial electronic engineering (IEE) in Malang city both partially and simultaneously. This research uses a quantitative approach with a descriptive correlational design. The research instrument was a questionnaire tested for validity and reliability. The research data analysis technique was carried out with analysis prerequisite test, partial correlation, multiple regression, and analysis of relative-effective contributions using SPSS. The results showed a positive and significant relationship between  $X_1$  and  $X_2$  to  $Y$ , either partially or simultaneously.

**Keywords:** communication skill, technological innovation capability, vocational skill in era 4.0

### INTRODUCTION

Indonesia has entered the era of the industrial revolution 4.0, and education continues to experience changes since then. Vocational high school (VHS) is expected to produce graduates who can play a role in developing the industry today (Billett, 2020; Eichhorst et al., 2015; Sutikno, 2014). Inversely with expectations, the fact is that the highest contributor to unemployment (8.63%) comes from vocational high school graduates (Badan Pusat Statistik, 2017), due to the low special skills students need to have (Munishi & Emmanuel, 2016; Oviawe et al., 2017). In addition, there is a mismatch between work and work skills possessed by students (Ayuningtyas et al., 2015; Azman et al., 2020). Supported by the results of observations on VHS competency industrial electronic engineering (IEE) in Malang city, it is known that the problem that students often face is, there is a mismatch between vocational skills obtained at school and those in the field required by the different industries. Moreover, students who work in industries must have vocational skills according to their majors (Hassall et al., 2010).

Many VHS graduates are ready to work, but most graduates do not have the skill sets competencies needed for the industry in the industrial revolution era 4.0. Related research revealed that 51.5% of workers in Indonesia did not meet the requirements and standards at

their work (Kurniawan, et al., 2019), showing the importance of vocational students having vocational skills in the 4.0 era challenges of the business world and the industrial world. Students with high vocational skills will be more adaptable by the world of work (Audu et al., 2013).

*Vocational skills* are the capacity needed to complete a series of tasks that develop from training and experience (McGrath et al., 2019; P. Ryan, 2019). In other words, vocational skills prepare and equip students to overcome various problems (Choi et al., 2019), especially facing life challenges in the industrial revolution era 4.0. Vocational skills are needed so that students have basic knowledge related to various fields of work, skills according to the needs of the world of work, and can adjust and have confidence (Persson & Hermelin, 2020). Research from various sources indicates that vocational skills in the 4.0 era are skills that vocational students need to have to master, develop abilities and skills, and overcome life problems in a job that exists in society in the industrial revolution era 4.0.

The workforce of VHS graduates in the era of industrial revolution 4.0 needs to be equipped with the skills to use and utilize technology in spurring competitiveness and productivity (Fraser et al., 2019; Ozer & Perc, 2020). In addition, today's world of work requires workers with personal and social skills (Jaedun et al., 2020). Students need life

skills (personal and social skills) that are adequate to adjust to the era of the industrial revolution 4.0. Based on this, vocational skills indicators in the 4.0 era consists of technological skills, social skills, and personal skills. The vocational skill level in era 4.0 will not just appear. The level of vocational skills is influenced by knowledge, experience, and motivation factors.

Communication skills that are interpreted as a process of interaction in expressing and channelling feelings, thoughts, ideas, knowledge, and information will increase vocational skills in the 4.0 era. The competence (vocational skills) cannot be optimal without the accompanying communication skills (Beer & Mulder, 2020; Jabarullah & Iqbal Hussain, 2019). Communication skills are the ability to convey and channel thoughts and ideas, whether in the form of science or technology, effectively.

Furthermore, using communication media causes ongoing communication to be more effective (Wiyono et al., 2020). The ability to communicate includes understanding, communicating thinking and feelings precisely, receiving and supporting each other, and resolving conflicts when communicating (Wahyuni et al., 2018). Moreover, communication skills consist of social communication, social insight, and social sensitivity. The level of communication skills can be revealed through aspects of articulating thoughts/ideas and feelings effectively, using media and communication technology, social sensitivity, and the ability to resolve conflicts when communicating.

Technological innovation capability is the ability to adapt to unexpected technological changes and use new technological processes to meet needs (Ince, et al., 2016). Aziati, et al. (2014) define technological innovation capability as continuously changing creative knowledge or ideas into new products, processes, and systems with technical support. Based on the explanation above, it can be indicated that technological innovation capability is the ability of students to implement ideas, modify resources, and adapt to technological changes to improve performance. Aziati, et al. (2014) revealed that technological innovation capability significantly impacts performance. Students with good technological innovation capability

will quickly create new knowledge and experiences. Through technological innovation capability that impacts performance, adaptability, and the creation of new knowledge and experience, students will have the maturity and readiness of vocational skills in the 4.0 era in entering the competitive business world and the industrial world.

Adapting from research Lau, et al. (2010), technological innovation capability is expressed through the dimensions of learning capability, organizing capability, and strategic planning capability. Hull & Covin (2010) define learning capability as the ability to generate ideas that can impact change, cross various existing limitations, and through special management initiatives. According to Lau, et al. (2010), organizational ability is defined as the capacity to form an established organizational structure, foster organizational culture, and coordinate work and activities towards the desired goals. Lau, et al. (2010) defines the capabilities of strategic planning as the ability of a person to identify weaknesses from himself and opportunities and threats from outside and adopt various types of strategies that can adapt to environmental changes to excel in a competitive environment.

Therefore, there is a possibility of a relationship between communication skills and technological innovation capability on vocational skills in the 4.0 era. If students have good communication skills supported by good technological innovation capability, it is expected to improve vocational skills in the 4.0 era. The purpose of this study is: (1) to partially investigate the relationship between communication skills and, technological innovation capability to vocational skills in the 4.0 era of IEE vocational competency students in Malang and (2) to measure and establish the relationship between communication skills and technological innovation capability in simultaneously with vocational skills in the 4.0 era of vocational students competing for IEE expertise in Malang City Indonesia.

## **METHOD**

This research is a quantitative research model with a descriptive correlational research design to predict a relationship between independent and dependent variables partially or simultaneously. The variables of this study are communication skills ( $X_1$ ), technological innovation capability ( $X_2$ ), and vocational

skills in the 4.0 era (Y). Sample data were collected from 136 vocational high school students in class XII IEE expertise competencies in Malang, Indonesia. Sampling research using random sampling was employed. The sample size was determined using the Slovin formula with an error rate of 5% and obtained a sample of 102 students. The data collection technique used was a questionnaire with a Likert scale of 4 for all research variables.

Each research variable has fulfilled the validity and reliability test. The communication skill variable has Cronbach's Alpha 0,800, technological innovation capability is 0,758, and vocational skills in era 4.0 is 0,800. The analysis that will be performed using the data from this research is descriptive analysis, hypothesis testing using partial correlation analysis, and multiple regression and contribution analysis. Before testing the hypothesis, the analysis prerequisite test consists of a normality test, linearity test, multicollinearity test, autocorrelation test, and heteroscedasticity test.

## RESULTS

The research data results for communication skill variables obtained an average value of 80.00, with the highest score of 97 and the lowest score of 53. The distribution of communication skill variable

data is presented in Table 1. The research data results for technological innovation capability obtained an average value of 73.65, with the highest score of 92 and the lowest score of 50. Data distribution of technological innovation capability variables is presented in Table 2. Research results data for vocational skill variables in era 4.0 obtained an average value of 80.48 with the highest score of 99 and the lowest score of 55. The distribution of variable data vocational skills in the 4.0 era is presented in Table 3.

The results of the analysis prerequisite test can be seen in Table 4. The normality test results with the one-sample Kolmogorov-Smirnov test indicate that the research data is usually distributed with the  $p_{sig} > p_{standard}$  (0.05). The results of the linearity test show that there is a linear relationship in which the  $p_{sig} < p_{standard}$  (0.05) between the independent variables ( $X_1$  and  $X_2$ ) with the dependent variable (Y). Multicollinearity test results obtained Tolerance value (T)  $> 0.10$  and VIF value  $< 10$ , from these data it can be concluded that the relationship between  $X_1$  and  $X_2$  does not occur multicollinearity. For the autocorrelation test, it is known that autocorrelation does not occur in linear regression, it is known by considering the DW value, where  $dU < DW < 4 - dU$ .

**Table 1 Frequency Distribution of Communication Skill**

Criteria	Interval	Frequency	Percentage (%)
Very high	81.25–100	43	42.16%
High	68,75–81,25	53	51.96%
Is	56.25–68,75	5	4.90%
Low	43,75–56,25	1	0.98%
Very low	25–43,75	0	0%
<b>Total</b>		<b>102</b>	<b>100%</b>

**Table 2. Frequency Distribution of Technological Innovation Capability**

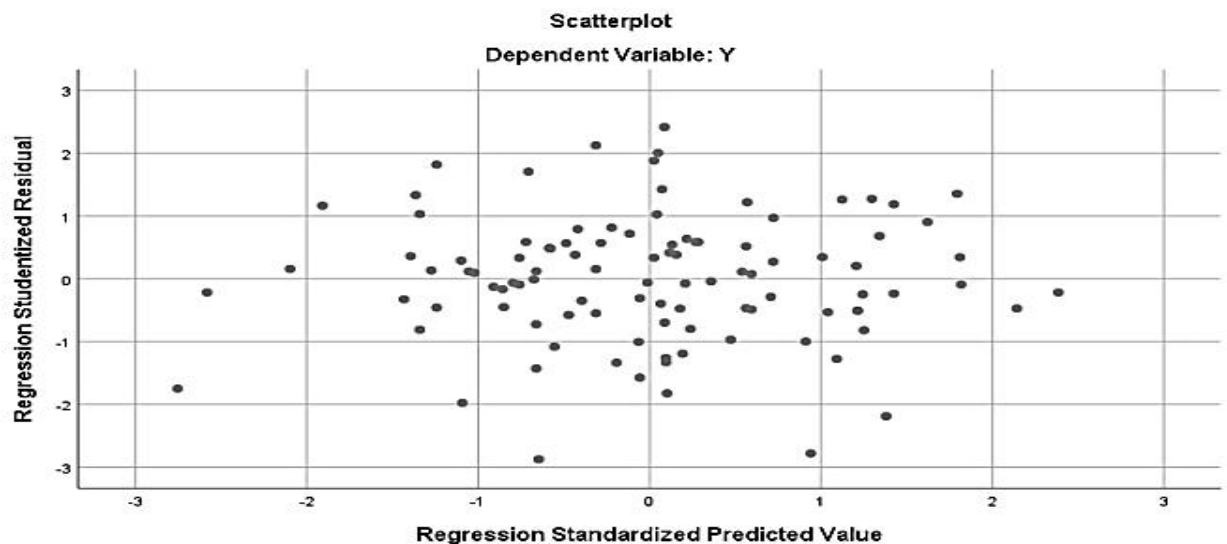
Criteria	Interval	Frequency	Percentage (%)
Very high	74.45–92	44	43.14%
High	62.95-74.45	51	50%
Is	51,45–62,95	6	5.88%
Low	39.95 - 51.45	1	0.98%
Very low	23–39,95	0	0%
<b>Total</b>		<b>102</b>	<b>100%</b>

**Table 3. Frequency Distribution of Vocational Skills in Era 4.0**

Criteria	Interval	Frequency	Percentage (%)
Very high	87,75–108	21	20.59%
High	74.25–87,75	59	57.84%
Is	60,75–74,25	20	19.61%
Low	47,25–60,75	2	1.96%
Very low	27–47,25	0	0%
<b>Total</b>		<b>102</b>	<b>100%</b>

**Table 4 Results of the Prerequisite Analysis**

Type of Tests	Results
Normality	$p_{sig} X1 = 0,200$ $p_{sig} X2 = 0.129$ $p_{sig} Y = 0,200$
Linearity	$p_{sig} X1 - Y = 0,000$ $p_{sig} X2 - Y = 0,000$
Multicollinearity	X1: T = 0.595 VIP = 1.682 X2: T = 0.595 VIP = 1.682
Autocorrelation	DW = 1,835



**Figure 1. Test of Heteroskedasticity**

Heteroscedasticity test results can be concluded that there was no heteroscedasticity. In the scatterplot diagram in Figure 1 there were scattered points and have unclear patterns below and above the 0-axis Y. with hypothesis testing. The partial hypothesis test results can be seen in Table 5, and simultaneous results can be seen in Table 6. The contribution of predictors to the research can be seen in Table 7.

**Table 5. Results of Partial Correlation Analysis**

Partial Correlation	Probability		Interpretation
	$P_{sig}$	$P_{standar}$	
$X_1 - Y$	0,000	0,05	Significant
$X_2 - Y$	0,018	0,05	Significant

**Table 6. Results of Simultaneous Analysis**

Sig. F	Coefficient			R	R square
	Con.	$X_1$	$X_2$		
0,000	27,344	0,418	0,267	0,579	0,336

**Table 7. Contribution of Predictor**

Predictor	SE%	SR%
Communication skill	20,87%	62%
Technological innovation capability	12,7%	38%
Total	33,57%	100%

Based on Table 5, it is shown that there is a positive and partially significant relationship between communication skills and vocational skills in the 4.0 era and between technological innovation capability and vocational skills in the 4.0 era. Table 6 presents a positive and significant simultaneous relationship between communication skills and technological innovation capability on vocational skills in the 4.0 era. The value of sig evidence is = 0,000 <0.05 and Regression (R) value of 0.579.

The regression equation for the relationship for communication skills and technological innovation capability to vocational skills in the 4.0 era is  $Y = 27,344 + 0.418 X_1 + 0.267 X_2$ . The regression equation can be interpreted as vocational skills in the 4.0 era worth 27,344 when not influenced by the value of communication skills and technological innovation capability. Simultaneously between communication skills and technological innovation capability will affect the value of vocational skills in the 4.0 era with a value-added of 0.418 per one unit of communication skill and a value of 0.267 per one unit of technological innovation capability. The contribution made by the variable communication skills and technology innovation capability to vocational skills in the 4.0 era was 33.57%, while 66,43% were influenced by variables and other factors not examined in the study. The relative contributions of communication skills and technological innovation capability are 62% and 38%, respectively. The effective contribution of communication skills and technological innovation capability was 20.87% and 12.7%, respectively.

## DISCUSSION

Based on the results of the analysis that has been done, shows the positive relationship and

significance between communication skills and vocational skills in the 4.0 era.

Communication skill is an essential thing in human life. Through communication, people can express themselves, form social life, develop personality, and expand skills (Khan et al., 2017). This means that IEE vocational students with communication skills will expand their skills or competencies, especially those needed in the industrial revolution era 4.0.

Students with good communication skills will influence the knowledge and experience that can be received, be easier to work together, resolve conflicts/problems, improve social competence and life skills in the industrial revolution era 4.0. Through this, it will be easier for the students to develop vocational skills in the 4.0 era needed to improve the competitiveness of vocational students in IEE expertise competencies in facing the business world and the industrial world challenges in the era of the industrial revolution 4.0. Furthermore, competence (vocational skills) cannot be optimal without the communication skills that accompany it (Wahyuni et al., 2018).

It is known that there is a positive and significant relationship between technological innovation capability and vocational skills in the 4.0 era. The era of the industrial revolution 4.0 requires vocational students to become human resources who can adapt to the advancement of knowledge and technology (Kurniawan et al., 2019). Technological innovation capability is the ability to adapt to unexpected technological changes and use new technological processes to meet needs Ince, et al. (2016), can be interpreted as the better technological innovation capability of students, the better the ability to adapt to the advancement of knowledge and technology. Meanwhile, one of the objectives of vocational skills is to adjust to society and have confidence (Choi et al., 2019). Students who have technological innovation capability can develop adaptability that supports vocational skills in the 4.0 era.

It is known that simultaneously there is a positive and significant relationship between communication skills and technological innovation capability on vocational skills in the 4.0 era. Students who have organizing capability have good perceptions of building relationships. On the other hand, indicators of communication skills include several aspects, including social sensitivity. By having social sensitivity, a person would be prosocial towards others. Meanwhile, social skills include working in teams, compassion, empathy, and networking (Fix et al., 2019; Fleckenstein & Lee, 2018), which means that students who have social sensitivity followed by organizing capability will more easily form social skills. So, it can be said that social sensitivity indicators on communication skill variables and organizing capability indicators on technological innovation capability support the high vocational skills in the 4.0 era.

Another indicator that forms/constructs the communication skills of vocational students in IEE expertise competencies in Malang is the ability to resolve conflicts when communicating. It is the ability to solve problems either originating from oneself or others constructively. Hull & Covin (2010) describe learning capability as the ability to generate ideas that can impact change, cross various existing limitations, and through special management initiatives. Meanwhile, the personal skills include having initiative, being brave to take risks, and being creative. In other words, having the ability to resolve conflict and learning capability, the student can also take the initiative and risk and foster creativity. Thus, the student has vocational skills in the 4.0 era, especially in personal skills.

Communication skills can affect vocational skills in the 4.0 era. Sriwidodo & Haryanto (2010) explained that competence (vocational skills) could not be optimal without the accompanying communication skills. However, this is less effective when students do not have an excellent technological innovation capability because mastering technology is necessary to compete in industry 4.0. A related study explained that the era of industrial revolution 4.0 requires vocational students to become human resources who can adapt to the advancement of knowledge and technology (Choi et al., 2019; Sima et al.,

2020). Both must be sought so that vocational students' competency IEE expertise in Malang can interact and modify resources and adapt to technological changes.

## CONCLUSION

This study concludes that there is a partially positive and significant relationship between communication skills and vocational skills in the 4.0 era of vocational students competing in IEE expertise in Malang. There is also a positive and significant correlation between technological innovation capability and vocational skills in the 4.0 era of vocational students of IEE competence in Malang. Simultaneously, there is a relationship between communication skills and technological innovation capability in vocational students' competency IEE expertise. In other words, communication skills are a more effective predictor of vocational skills in the 4.0 era.

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