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National Standards of Education affect the emplotment opportunities of vocational high school graduates

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ABSTRACT

This study aims to find out the National Standard of Education indicators that are the most dominant in influencing vocational schools, especially in producing the expected outcomes. The research is aimed at vocational schools in the field of economics and finance in the city of Surabaya. The data collection includes NSE assessment data from BAN-SM and employment opportunities from 22 schools. The object of further research is processed with the WARP PLS program. The study results found that there is a variable signification between the National Standard of Education on employment opportunities of vocational school graduates. Positive influence indicates that the higher/better the National Standard of Education, the higher or improved the outcome of vocational school graduates. Based on the results of the analysis indicator, the study found the NSE 8 indicator is the Education Assessment Standard which has the highest component weight value that indicates that the NSE's institutions are most important in producing graduates who are absorbed in the workforce. Then, the second-highest order is the NSE's indicative 2 and 1, namely process standards and content standard. For the indicator with the lowest value is the indicative standard educators and educational personnel and facilities and infrastructure Standard.

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INTRODUCTION

Vocational schools as a national education system play a very important role in creating a skilled national workforce. In essence, vocational high school graduates are expected to produce special skills-capable resources that will be expected to be a skilled workforce in their field. BPS data for 2018 explains that the largest level of Open Unemployment (TPT) among the vocational high school workforce is 11.24%, an increase from the previous 8.92% in February 2018 (Alika, 2018). Based on the Badan Pusat Statistik of the Republic of Indonesia (BPS RI), it is known that the number of open unemployed in August 2019 amounted to 7.05 million people, an increase from August 2018, which was only 7 million people. Then, the Head of the Central Statistics Agency of the Republic of Indonesia, Suhariyanto, said that the open unemployment rate was dominated by vocational high school graduates of 10.42 percent in August 2019 (Badan Standar Nasional Pendidikan Republik Indonesia, 2007).

Open unemployment reflects the population who are ready to work but do not have a job. Based on previous data, it shows that vocational high schools that are expected to bring graduates ready to work still have problems. Factors of job opportunities and human resource skills still play

an important role. This reflects the importance of the influence of secondary school education levels in contributing to unemployment in Indonesia. Vocational high school graduates are expected to be graduates who are skilled and ready to take on job market opportunities. But in fact, the level of trust in the business and industrial worlds towards vocational school graduation is still low. This was strengthened by Bamalli (2014) that the vagueness of competence achieved, a unilateral implementation that causes students not to progress in the business world/industry and do not recognize the skills obtained outside the school becomes a weakness possessed by the old vocational education.

The government has actually made policies to address these issues. Government policy in the field of education as contained in Law No. 20 of 2003 on the National Education System contains the basis and objectives of the implementation of education, compulsory learning, a guarantor of the quality of education, and the community's participation in the national education system. The policy was made to produce good Indonesian Education and qualified graduates at all levels of education. The government stipulates Government Regulation No. 19 of 2005 concerning National Education Standards and the establishment of the Badan Standar Nasional Pendidikan (BNSP) of the Republic of Indonesia as the agency that determines eight standards of educational achievement.

Based on this background, researchers are interested in discussing research on national standards of education and their benefits in outcomes for vocational high schools in Surabaya. This research aims to explain the importance of the implementation of the National Standard of Education and the need for equalization of the quality of National Standards Education at the vocational schools level in creating graduates. This is based on vocational high school graduates who have been prepared to have skills and knowledge that can later be applied to professionals in the world of work.

National Education Standards are the minimum criteria for the education system in all jurisdictions of the Republic of Indonesia (Kementerian Pendidikan Nasional Republik Indonesia, 2007) in improving the quality of human resources and measuring the education quality. This standard is not a fixed standard but is increasingly being improved. In addition, education standards also function as a quality education map. In the United States, education policy states that every student to graduate from high school is prepared for college and a career. National Education Standards discusses three kinds of variations in content/curriculum, performance standards, and student achievement (Barton, 2009). National law has mandated study programs (POS), which outline a sequence of courses aligned with secondary and post-secondary education, integrate academic, and Career and Technical Education (CTE) fields based on standards, and include work-based learning opportunities (Castellano et al., 2017).

In describing and implementing the National Education System Law No. 20 of 2003, the government issued this regulation so that the implementation of education can be in accordance with the mandate of Pancasila and the 1945 Constitution, namely good and quality education. Therefore, it is necessary first to determine the standard that should be a reference for the implementation of educational activities at the level of macro and micro. In this relationship, Government Regulation No. 19 of 2005 can be seen as an effort towards achieving this. An important thing in this Government Regulation is the need to establish an institution called the Badan Standar Nasional Pendidikan (BSNP) of the Republic of Indonesia to determine standards and criteria for achieving education delivery.

Government Regulation No. 19 of 2005 is basically a general standard for the implementation of education so that it requires operationalization in various aspects of education. Minimum standards for the provision of education as stated in article 2 of Government Regulation No. 19 of 2005, include: 1.) Content standards; 2.) Process standards; 3.) Graduate competency standards; 4.) Teachers and education staff standards; 5.) Facilities and infrastructure standards; 6.) Management standards; 7.) Financing standards; and 8.) Education assessment standards. Content Standards are the scope of materials and competency levels outlined in the criteria on graduation competencies, competencies of study materials, competencies of subjects, and learning syllabus that students must meet at certain levels and types of education. Content Standards are tailored to the substance of national educational objectives in the domain of spiritual attitudes and social attitudes, knowledge, and skills (Kementerian Pendidikan dan Kebudayaan Republik Indonesia, 2016).

Process Standards are standards related to the implementation of learning in educational units to achieve graduate competency standards. Process standards include planning the learning

process, implementing the learning process, assessing learning outcomes, and monitoring the learning process. The overall characteristics of the learning process in senior high and vocational schools are subject-based, although the thematic approach is still maintained. Graduate Competency Standards are qualifications of graduate abilities that include attitudes, knowledge, and skills. Competency Standards for Graduates consist of criteria for qualifying students' abilities which are expected to be realized after completing their learning at school at the primary and secondary education levels. Efforts to determine the achievement and suitability of the Competency Standards for graduates and graduates from each school and the curriculum used in certain schools need to be monitored and evaluated regularly and continuously every period. These results are used as input for improving the Competency Standards for graduates in the future (Kementerian Pendidikan dan Kebudayaan Republik Indonesia, 2016).

Teachers and Education Personnel Standards are the criteria for pre-service education and physical and mental eligibility, including education in an office. Facilities and Infrastructure Standards are standards related to minimum criteria related to study rooms, sports places, places of worship, libraries, laboratories, workshops, playgrounds, recreation areas, and other learning resources needed to support the learning process, including the use of information technology and communication. Management Standards are standards related to the planning, implementation, and supervision of educational activities at the school, district/city, provincial or national level in order to achieve efficiency and effectiveness in the delivery of education.

Financing Standard is a standard that regulates the components and the amount of operating costs of educational units that are valid for one year. Education Assessment Standard is a national standard of education related to the mechanisms, procedures, and instruments of assessment of student learning outcomes (Kementerian Pendidikan Nasional Republik Indonesia, 2009). Vocational high school education is part of the education system that prepares students to be competent in one group of work or one field of work over other fields of work. This is in accordance with the mandate of the Sistem Pendidikan Nasional (Sisdiknas) Law, that vocational education is an education that prepares students to be able to work in a particular field or prepare students to enter the world of work (Kunandar, 2007). Based on the statement, vocational high schools focus on a specific skills program or educational programs tailored to the needs of the job.

Government Regulation No. 19 of 1990 concerning vocational secondary education article 3 Paragraph 2 vocational high schools prioritize the preparation of students to enter the workforce and develop professional attitudes. The meaning of the end result of vocational high schools is that graduates are ready to work with a professional attitude which will benefit the application of their skills to certain job fields. According to Decree of the Ministry of Education and Culture of the Republic of Indonesia No.001a/O/1999 concerning vocational high schools article 2 paragraph 1, the purpose of education in vocational high schools is to prepare students to continue to higher levels of education and expand basic education; Increase the ability of students as members of the community in making reciprocal relationships with the surrounding social, cultural and natural environment; Improve the ability of students to develop themselves in line with the development of science, technology and arts and equip students to jump into the real world of work and develop professional attitudes.

The outcome is defined as a condition that reflects how much of the total workforce can be absorbed or actively participate in a country's economic activities. The understanding conveyed by some experts means that outcome is the long-term effect of the educational process, for example, achievement, acceptance to further education, further training, job opportunities, income, and further prestige (Kaluge, 2003) or participants' response to the services provided in a program; or the impact, benefits, expectations of change from an activity or service of a program. Bishop and Mane (2004) study found that most vocational high school students have significantly higher levels of school experience and higher high school graduation rates in some countries. The results also show that computer courses profoundly affect the stages eight years after they graduate. Employment opportunities can not be separated from the principle of supply and demand of workers, namely labor and labor market. Labor is everyone who is willing to be able to work (Sumarsono, 2010). While the labor market is all the activities of actors who bring together job searchers with job openings or meet the demand and supply of labor (Sumarsono, 2010)

In requesting labor, the company will pay attention to various aspects, such as filling existing vacancies with the right human resources (Sumarsono, 2003). This means that there is a match between job vacancies and the prospective workforce's level of education and skills. When it comes to a workforce with a level of education and skills, we can distinguish between an educated and unedified workforce. The educated labor market is a labor market that requires special qualification requirements that are usually obtained through formal education and require a long time and considerable educational costs. While the unedified labor market is a job market that offers and asks for labor that does not require special qualifications and a relatively low level of education.

Vocational school curriculum should prioritize subjects related to employment and employment or as referred to as Link and Match Model that is to choose subjects and majors that can support the work. But in fact Kunandar (2007) states that educational institutions are more often fixated on theory so that students are less innovative and creative and lack competence. According to Meer's (2007), students on the vocational track would benefit from a more academically stricter education. Selection confounds attempts to decipher the effects of academics on after-secondary income.

The current trend in society shows that a person's education level does not significantly affect a person's growth but has more influence on the level of skills they have and the ability to apply these skills in the real world of work (Okolocha, 2012). To produce vocational school graduates that are in accordance with the needs of the business world (du) and the industrial world (di), which in real terms continue to develop over time, the vocational curriculum must be designed and implemented to adjust the development of science and technology. Teachers as one of the important components in the learning process should be able to choose a teaching and learning activity that sat down students, so that when students are faced with problems that exist in real life. Students can associate and seek the initial knowledge they have to solve a problem.

Several previous studies have been partially conducted, both from each indicator in the National Standard of Education, graduate learning outcomes towards employment opportunities in the world of work. Handayani (2005) research proves the influence of school facilities and infrastructure on vocational school graduates. Manalu et al. (2017) shows the influence of tuition fees on the output of students in elementary to secondary level. Akkoyunlu (2002) argues that teaching materials such as textbooks, overhead projectors, radio, films, television, video recorders, and computers enrich the learning environment in schools. Teaching materials motivate and encourage students to study subject matter while providing opportunities for students to access and explore information.

The statement about the components of National Education Standard was also strengthened by Astuti (2011) in his research which with the results of the Influence of teacher competence, learning media, and industrial business world on the quality of graduates at vocational high School 2 Wonosobo. The study examined the individual variables in the NSE as well as the output of the education unit. There has been no research combining the NSE's overall variables and the education unit's output on employment opportunities.

Department of Education Republic of Indonesia (2007), states that student learning assessment in America is needed to reach more effectively for students and to the public, Central America Commission on higher education revised accreditation standards, characteristics of excellence in higher education namely requirements and standards accreditation, to improve requirements and recommendations for setting learning goals and assessing student achievement. Assessing students from the process will assist the institution in teaching students in selecting institutions, managing their own learning, and planning and supporting students for the institution. This handbook serves as a resource for institutions looking for a bridge between the standard accreditation section and the institution as a practical daily challenge of assessment and continuous improvement.

Xiaomu et al. (2008) in their research, states that the Information Literacy Competency Standards for Higher Education in Beijing consist of seven first-level indicators (standards), nineteen second-level indicators (performance indicators), and sixty-one third-level indicators (results). The importance of making competency standards in China as a developing country is because many secondary school graduates lack information awareness.

Bonner et al. (2010) states that educational infrastructure has an important role. In this condition, the location and nature of school infrastructure affect the access and quality of education, namely the closer the schools are, the more likely they are to attend, both because of distance and

safety issues; where the quality of infrastructure (particularly water and sanitation) is improved, enrollment and completion rates are also improved and teacher absenteeism is less, and the condition of school facilities is improved, learning outcomes are also improved. It has the greatest impact in terms of education infrastructure, which will vary from school to school. All necessary educational infrastructure facilities are essential for effective teaching and learning, such as classrooms, outdoor learning and play areas, furniture, water and sanitation, administrative buildings, storage, and facility readiness. Harahap (2009), in his research, concluded that one of the variable components of the standard of educators and educators (teachers) has no significant effect on the employment opportunities of graduates referred to as outcomes either before or after the NSE. But this is not in line with the results of Listiyani (2019), which concluded that the entrepreneurial competence of the Headmaster of Vocational High School 6 Palembang plays an important role in advancing schools.

Improving the quality of the implementation of government programs will support the progress of education in Indonesia, but the quality of education has not changed for the better. The development of education is seen from the graduation rate and the level of graduate absorption in the real world of work. According to Lynch (2000), there are 4 (four) forces that support the reform of secondary school vocational education in the United States, namely the new economy, public expectations for schools, new research on student learning and motivation, and secondary school reform. Six integral components for reform: secondary school, elementary and contextual learning, work-based learning, authentic production, career academy, and technology preparation.

The results of Elfitri et al. (2019) show: 1.) Content standards and standards have a positive and significant effect on national exam scores; 2.) Teacher and education staff standards have a positive and significant effect on the number of vocational high school graduates who are accepted to work in the business or industrial world; 3.) Process standards have a negative and significant effect on the number of vocational high school graduates who are accepted to continue their education in tertiary institutions; and 4.) Graduate competency standards, facility standards, management standards and management quality and the quality of vocational high school graduates. This means that other factors affect the academic quality of vocational middle school graduates, such as the parents' background, motivation, and interests of the students themselves.

RESEARCH METHOD

This study was conducted to analyze the indicators of National Standards of Education and Education unit output that is dominant against the work of vocational school graduates in Surabaya. This study is classified into ex-post factor type of research because researchers do not give treatment or manipulate specific changes of the study subjects. The data used is available without having to perform a data search. This ex post facto research method was carried out to examine the events that occurred and reduce to find out the factors that could lead to the occurrence of these events (Riduwan, 2013).

The researchers' design is done with a descriptive quantitative approach to know the signification of the influence of the national standard of education applied by public vocational secondary schools and private expertise group economy/accounting to the employment opportunities of vocational students in the city of Surabaya. The data analyzed in this study is primary data equipped with secondary data obtained from the Surabaya Education Office, each school's data that becomes the object of research, and other relevant data. Data processing is done with the PLS program. The primary data source is the National Standard of Education data obtained from the National Education Standards Agency of East Java Province in the form of the value of each indicator National Standard of Education. Then, secondary data is obtained from the spread of questionnaires about the absorption rate of graduates of each vocational school of Surabaya.

The population of this research is all vocational high schools both state and private in Surabaya, which has majored in economics or accounting and finance vocational high School in Surabaya. The sampling technique in this study is purposive sampling. Purposive sampling is a sampling technique with certain considerations (Sugiyono, 2013). In this study, sampling determination using considerations as follows: 1.) The sample is a public and private vocational school with majors in marketing, office administration, accounting, and banking considering the background of

researchers in economics and accounting; 2.) Samples are based on the availability of primary data in the field, especially vocational schools that have been accredited in the National Accreditation Board For School and Madrasah, to obtain valid source data; and 3.) The data of graduate years 2014 and 2015 was selected based on the availability of employment opportunity data of graduate students recorded in the school is the data of graduate students two years earlier. Based on the initial observations, the school takes approximately 1-2 years to obtain data of students who have worked.

The research is trying to link NSE variables to employment opportunities. This study consists of independent variables, namely variable National Standard of Education and graduate outcomes. In accordance with Government Regulation No. 19 of 2005, the measurement for the national standard of education as much as 8 (eight) namely NSE 1, content standards; NSE 2, standard process; NSE 3, graduate competency standards; NSE 4, standards of educators and education workers; NSE 5 standard of facilities and infrastructure; NSE 6, management standards; NSE 7, funding standards; and NSE 8, assessment standards. The measurement uses document data from National Professional Certification Agency in the form of values 10-100.

Then for graduate work is a field or type of work that is able to provide opportunities for someone to do activities to generate wages (salary). Measurement of employment opportunities graduates is reflected by the variable manifest/indicator, the percentage of the number of graduate students absorbed in the world of work. The data generated on the variables above are data in the form of an average assessment range of 10-100 for the National Education Standards and a percentage of 10-100% for graduate employment opportunities.

This study used data analysis techniques using Structural Equation Modeling (SEM) analysis using PLS (Partial Least Square) through WarpPLS application. The data analysis in this study uses descriptive and inferential statistics pls (Partial Least Square) and is equipped with simple correlation because the sample does not meet the minimum recommended size (100-200), then can use an alternative method sem, namely partial least square (PLS), namely SEM-based components or variance. PLS is non-parametric and is not bound by the assumption of data that must be distributed normally in a multivariate manner or the need for many samples (Latan & Ghozali, 2015).

The reasons for using PLS analysis in this study are: 1.) This model does not assume a certain distribution of data which can be in the form of nominal, category, ordinal, interval, or ratio; 2.) The variables used in the study are latent variables; 3.) The entire population of SMKs in Surabaya is used as a sample, but the number is small (n <100), so it does not meet when using SEM analysis (Structural Equation Model), and the size of the sample enters intervals of 30 to 100 as recommended by PLS; and 4.) Ability to overcome LVs (latent variables) that cannot be measured directly but that require measurement of models consisting of one or many indicators (Urbach & Ahlemann, 2010). Evaluation of models in PLS-SEM using the WarpPLS program can be done by assessing the results of model measurement (measurement model). Steps in analysis WarpPLS (Solimun et al., 2017).

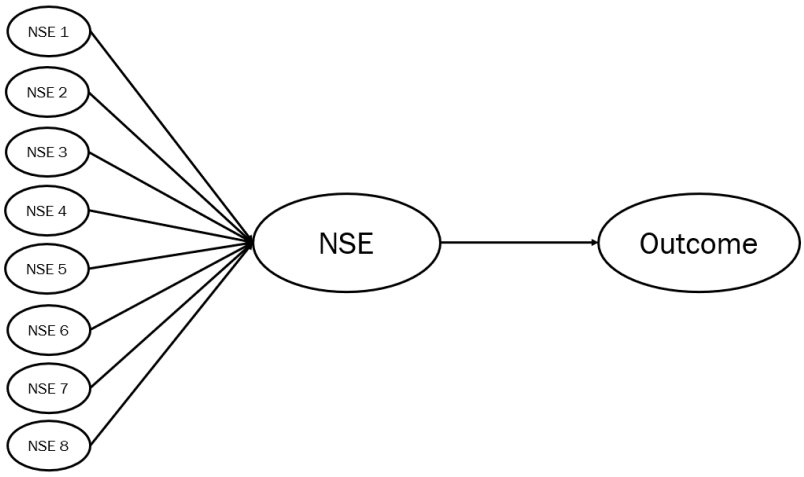

Figure 1. Model Path

RESULT AND DISCUSSION

Based on the results of the analysis of fit and quality indices model as a whole produces calculation results that meet the criteria of both APC, ARS, AARS, AVIF, AFVIF, GoF with medium criteria, SPR, RSCR, SSR, and NLBCDR, which all meet the criteria, this means the level of a good relationship between latent variables (inner model) both overall. In this study, one hypothesis is proposed to test the direct influence between NSE variables on outcome variables. Hypothesis testing on WarpPLS analysis basically tests the significance of the coefficient of pathways present in the research model. The test results of the path coefficient are presented in the following tables 3 and 4.

Based on the results of data analysis using WarpPLS, there is an influence of variable X on variable Y with a coefficient of the path of 0.609 and $p < 0.001$. Since P is smaller than 0.01, it can be said to have a significant effect on the level of error of 1%, so the hypothesis is accepted. A positively marked line coefficient of 0.609 indicates that the better/higher the National Standard of Education, the Y increases with a greater influence of 60.9%.

Conditions of National Standard of Education Vocational High School

Table 1 is data processed by researchers taken from the results of assessments conducted by BAN / SM for 22 vocational management and business schools in the city of Surabaya. Based on the value obtained, a value shows the average value of each component of the National Standard of Education. The average content standard value shows a value of 83, process standard with a value of 82, graduate competency standard with a value of 80, standard educators and educational personnel with a value of 78, Standard Facilities and Infrastructure with a value of 77, management standard 79, financing standard with a value of 84 and, education assessment standard with a value of 82. the results of the assessment showed the average value of the eight components of the NSE could be said good, in general vocational high school majoring in business and management in the city of Surabaya has implemented components in the NSE well.

Table 1. Assessment of Components of National Standard of Vocational Education business and management

No.	NSE	Average
1.	Standard Content	83
2.	Process Standards	82
3.	Graduate Competency Standards	80
4.	Standards of Educators and Educators	78
5.	Standard Facilities and Infrastructure	77
6.	Management Standards	79
7.	Financing Standards	84
8.	Education Assessment Standards	82

(Source: Data processed researchers)

Outcome Condition (Graduates Absorbed in the World of Work) Vocational high School

The education outcome unit is used as a research object as a variable that is affected by the National Standard of Education variable. The output in question is the number of graduates of vocational high schools in Surabaya who are absorbed in the world of work. Data from the Ministry of Education and Culture in 2017 stated that there are 105 public and private vocational schools in Surabaya. The number of vocational schools filters the number registered as National Accreditation Board for Schools and Madrasas accredited schools in East Java Province in 2014 - 2015 and research restrictions on vocational schools with departments of Management and Business so that a total of 22 state and private vocational schools are filtered as research objects.

A vocational high school is a school that is built or established to create graduates ready to work according to their interests and talents. Proof of readiness of vocational schools in the city of Surabaya has provided a special section called BKK (Special Work Guidance), which is in charge of recording and providing information and even providing employment to students who have

graduated in the vocational school. This is in accordance with the statement of Government Regulation No. 29 of 1990 concerning middle education chapter I article 1 paragraph 3 states that vocational secondary education is an education at the secondary level that prioritizes the development of students' ability to carry out certain types of work. Although vocational high school was formed to build an independent person and ready to plunge into the world of work, in fact, graduates still choose to continue to a higher level of education, namely higher education.

Descriptive Quantitative Analysis Results

Data collection techniques for variables of National Standard of Education using primary data obtained from the National Accreditation Board of Secondary Schools of East Java Province, while data collection techniques for graduate outcomes are obtained from the results of written interviews through the dissemination of questionnaires to the intended school. Surabaya is the second-largest city after Jakarta. Surabaya city government is sensitive to the importance of education for its people. Proven in 2015 Surabaya city government implemented compulsory learning for 12 years that ratified the school up to the level of high school or vocational school. In 2016, there were 102 vocational high schools recorded in Surabaya, both public and private.

Based on the results of tabulation of NSE variable data with average methods, it can be described that the average school that is the object of research has a good condition of National Standard of Education. The NSE's condition in schools that are already good is the School Condition with National Standards of Educators and on Standards 1 (content standards), Standards 2 (process standards), Standards 7 (financing standards), and Standards 8 (educational assessment standards).

The condition of the National Standard of Education in schools is best in the 7th Standard, namely financing standards. The NSE's condition in schools is the lowest in Standard 4 (standard educators and educational personnel), then standard 5 (standard facilities and infrastructure). The findings are very contrary to what should be, considering the importance of human resources (educators and education) as the subject of processing raw materials and infrastructure as containers and supporting resources in processing the students to be ready to compete in the outside world later so that both standards need to be improved even better.

On the average value of graduate outcome data is still seen graduates with the absorption of the world of work in accordance with the majors taken by the majority below 50%. Based on the results of field observations found that the average vocational school students generally school in the middle of the city choose to continue their education to higher education while vocational schools in the suburbs prefer to work directly. This is because graduates have now started to think openly about the demands of education in the world of work, such as the level of education that will determine their position in work.

Graduates who choose to continue to higher education with adequate financial support so as to support their decision, while suburban school graduates with the majority of middle and lower economic students prefer to work despite their desire to continue to higher education but because of financial limitations so that work is the right choice to later be used as capital to continue to higher education.

The Influence of National Standards of Education on Employment Opportunities of Vocational School Graduates

The National Education Standard was established to equalize the quality and quality of schools in an effort to reduce the gap between schools. In fact, the implementation of the National Standard of Education is intended for public schools and private schools. Such efforts allow for no quality gap between public and private schools, suburban schools, and middle-of-town schools.

Hypothesis testing shows a significant influence of The National Standard of Education on the employment opportunities of vocational school graduates in the city of Surabaya. The results of this study indicate the importance of standards that become a reference for the implementation of educational activities at a small-scale level of large DNA as stated in the National Education System Law No. 20 of 2003, so that the implementation of education can be in accordance with Pancasila and the 1945 Constitution, namely good and quality education.

This research reinforced the research of Xiaomu et al. (2008), Harahap (2009), Bonner et al. (2010), and the Department of Education Republic of Indonesia (2007) which resulted in the conclusion that the National Standard of Education directly affects graduate employment opportunities even though the research was conducted partially in the NSE component. Department of Education Republic of Indonesia (2007), states the Characteristics of Excellence in higher education, namely the requirements and Standards of Accreditation of Higher Education, to improve the requirements and recommendations in setting learning objectives and assessing student achievement. The characteristics of excellence can be seen from how the college manages the management of the institution well.

Research by Marquez-Zenkov et al. (2007) concluded that the quality of teachers was not sufficient in producing quality and competitive student output in the world of work. There needs to be a government regulation that regulates the curriculum according to regional potential. This type of evaluation is tailored to the curriculum used with the Teacher's license program, which is based on the concept of socially just leadership and a portfolio assessment system. So there needs to be a relationship between the quality of educators and management of education management.

Consistent with the study of Nastiti and Wahjusaputri (2019), which states that the quality of national education is not sufficient to produce quality outcomes for students, adequate school facilities are needed in the form of facilities and infrastructure, appropriateness of teaching methods, curricula and government policies in education. As in Indonesia, Harahap (2009) strengthens through his research regarding the direct relationship between the National Education Standards and employment opportunities, explaining that apart from teachers and education personnel, it is necessary to match the components of facilities and infrastructure, financing in producing the desired graduate job opportunities.

Several previous studies have shown the importance of educational standards in managing schools for equalizing the quality of the school in the same mission vision to achieve the goal of vocational high school, which is to create graduates who are creative, independent, and ready to compete in the world of work.

Analysis of National Standards of Education Indicators on the Outcome

Table 2 shows the NSE 8 indicator has the highest component weight value with a value of 0.953. This indicates that the most important indicator of the National Standard of Education in producing graduates absorbed in the world of work is the Education Assessment Standard. Empirically the average value of standard 8 is that the assessment of education also falls into the category of good, so it is recommended to be maintained.

Table 2. NSE Variable Profile (X)

No.	Indicators	Component Weight	Average (Empirical Condition)	Advice
1	NSE 1	0.908	83,37	Maintained
2	NSE 2	0.932	82,42	Maintained
3	NSE 3	0.896	79,80	Improved
4	NSE 4	0.859	77,63	Upgraded Soon
5	NSE 5	0.854	77,41	Upgraded Soon
6	NSE 6	0.833	79,25	Improved
7	NSE 7	0.751	84,54	Maintained
8	NSE 8	0.953	82,30	Maintained

This indicates that in general vocational high schools in the city of Surabaya have met the standards of educational assessment in accordance with the rules set by the government, namely to meet the principles, among others: objective, valid, fair, integrated, open, thorough and sustainable, systematic, based on criteria, and accountable. This principle is considered very important in evaluating the results of reasoning knowledge obtained by vocational high school students to prepare them for self-study in the world of work. In general, the assessment of vocational school students in

Surabaya refers to assessments with contextual activities prepared by the school, for example, banking practices, trade cooperatives, all of which are faced with real work assessments.

The second high position level occupied NSE indicators 2 and 1, namely process standards and content standards. Process standards include planning the learning process, implementation of the learning process, assessment of learning outcomes, and supervision of the learning process to implement an effective and efficient learning process. While the standard of material content is minimal and the level of competence is minimal to achieve the competence of graduates at a minimum at a certain level and type of education (Kementerian Pendidikan Nasional Republik Indonesia, 2006).

In value, the weight of the components of both indicators is worth 0.932 and 0.902 with empirical values at an average of 8. This indicates that it is necessary to maintain these indicators to create graduate students who can be absorbed in the world of work. Empirically these three highest indicators are interrelated. Good educational assessment can be carried out by the existence of a good standard of the process that is through supervision of the learning process and must pay attention to the minimum content standards that each student in the vocational school must own.

These results are in line with Allejar (2017) research on the importance of process standards in producing learning effectiveness. Implementing the Education Process Standard Policy has a positive and significant effect on curriculum management to realize the effectiveness of learning. The results of hypothesis testing show a relatively large influence. Empirically, this hypothesis test provides an idea that the implementation of optimal Education Process Standard Policy and the existence of good curriculum management can influence the realization of learning effectiveness.

In other indicators with the lowest value that needs to be improved, especially in the NSE 4 indicator, namely the standard of educators and educational personnel and standard 5, namely facilities and infrastructure. Both indicators in the results of the data processing of this study are considered less instrumental in increasing the number of graduates absorbed in the world of work empirically. Human resources are an important key in processing and processing students to be able to become products and infrastructure facilities as facilities to support teachers as containers and tools to create students who are ready to be independent and competitive in the world of work.

The results are in accordance with the research of Bonner et al. (2010) on the importance of facilities and infrastructure in his research stated the importance of Educational Infrastructure Facilities. In line with the research of Ramadhan dan Soenarto (2015) stated in his research that facilities and infrastructure are factors that affect the learning achievement of vocational school students. High student learning achievement will improve the quality of students both knowledge and skills that will be able to compete in the world of work.

CONCLUSION

Based on the results of data analysis, it can be concluded that there is a significant influence between the National Education Standards on the outcomes of vocational schools graduates in Surabaya. The results of this research indicator analysis found that the SNP 8 indicator has the highest component weight value, which indicates that the most important indicator of National Education Standards in producing graduates who are absorbed in the world of work is the Education Assessment Standard. Then the next highest order is the SNP 2 and 1 indicators, namely process standards and content standards. The indicator with the lowest score is the SNP 4 indicator, namely standard for teachers and eucation personnel and standard 5, facilities and infrastructure. The two indicators are considered to have less role in increasing the number of graduates who are absorbed in the world of work empirically, but that does not mean they are not important, so they need to be improved.

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Consumer behavior-focused training in retailing education: Too much of a good thing?

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ABSTRACT

Consumer behavior training extensively delivered in the tertiary vocational school of business had been expected to equip students with deep knowledge in marketing and sales. This was true when students were dealing with general business environments, but it was dubious when it was implemented in a certain field of business, such as retail business. Retail business, predictably, had a unique characteristic in its business decisions. Students in the Marketing Program of a tertiary vocational school in their final year were the object of the study. Employing the non-parametric tools to assess student knowledge in consumer behavior and its association with retailing decisions mastery, it was found that student mastery in consumer behavior did not associate with better knowledge in other five retail business decisions (determining the composition of goods, spotting locations, pricing, profit strategy, and store management). The article also provided a brief explanation that specific knowledge in consumer behavior did not always in line with the required knowledge in the retail business. It was also suggested that to elaborate whether one particular knowledge of business practices had a valuable feature was, first, by determining its overall decisions relating to it. Then, the second, establishing a series of analyses to assess whether the decisions have any relations with the college's courses or training of a field of study. Comprehension of the process might help the vocational school to equip students with the right required knowledge and skills for a certain field of business.

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INTRODUCTION

With more than 250 million people, of which are buoyant private consumers, Indonesia is recognized as the main driver of Indonesia's robust economic growth (Baur & Wee, 2015; Yuningsih, 2019). The high growth in consumer spending in grocery, more than 45% within the last five years (Nielsen Indonesia, 2018), means Indonesia has a positive financial sentiment in the retail business. According to the Reynolds (2019), retail trade-in Indonesia had increased 0.7% Year on Year in September 2019, following a 1.1% rise the previous month, supported by sales of food, beverages, and tobacco (1.4% vs. 0.3% in August) and household equipment (11.1% vs. 8.3% in August). Further, in the last quarter of 2019, Indonesia's consumer spending was above 1,500 trillion Rupiah, the highest value since 2010. All these facts imply that the buying behavior of Indonesian retail

consumers is very attractive to foster retail business. Various retail formats respond to this to cultivate the huge opportunity of the business.

Both major global and local retailers compete to service Indonesia consumers, from Metro, Sogo, Carrefour, McDonald's, and Pizza Hut, to Ace Hardware, Informa, Gramedia, and Rumah Makan Sederhana. The global and local retailers (even in the traditional format, like the street vendors and sellers in the wet market) are consistently competing for the retail market share. In recent years, retailing in digital format has also entered the Indonesian market. The OLX, Booking.com, Shopee, Traveloka, JD.ID, Tokopedia, and Gojek groups are among the most aggressive digital retailers. Buying a house, a train ticket, or even ordering favorite foods is even easier for the consumers.

The lucrative opportunities of the retail business lure many vocational schools in tertiary level (i.e. vocational colleges) to engage with the dynamics of the Indonesia retail business. numerous undergraduate programs are offering retailing management skills to their students. The schools offer various training series on the specific sets of retailing management decisions (Cox & Brittain, 2004; Dunne et al., 2013; Levy et al., 2019; Nielsen et al., 2012; Schroeder, 2002). Our scant interviews with students of a tertiary vocational school revealed that they had basic and essential knowledge in defining consumer behavior (as discussed in general marketing management courses). The students also implied that marketing management's consumer behavior perspective had identical features for every business. At this point, we doubted if it implied a necessary-and-sufficient footing when coping with some decisions in the retail business.

Trends in the world of retailing are not simply triggered by the shifting preference of consumers (Chatterjee & Kumar, 2017b, 2017a; Grewal et al., 2018). Technology advancement is also the important driver for shaping the retail formats as well as driving the shift preference of consumer behavior. In fact, the two mentioned drivers may affect one to another to form the trends in retailing. The assumption implies the possibility that current knowledge in consumer behavior is not the only focal point to foresee future trends in retailing as well as to deliver trends in retailing education.

Following the work of Grewal et al. (2018), by tracing back the topics covered in Retailing Management text book co-authored by Levy and Weitz from 1992 until 2018 or ten years editions, it was shown that topics covered in retailing education had been advancing from agile delivery system, television shopping, electronic retailing, multichannel retailing, Geographic Information System (GIS) technology, and customer relationship management systems in the first five editions to radio frequency ID, website design, in-store kiosk, digital signage, social media, mobile retailing, big data, and retailing analytics, omnichannel retailing, and robotics in the sixth to tenth editions. The study portrays that both retailers (when choosing the appropriate technologies to engage their customers) and retailing (through technology advancement) are in "co-influencing" mode in shaping the future trends of retailing.

Complementing the perspective, another study has a slightly different perspective when predicting the future trends in retailing, it focuses on consumers' needs to drive their purchasing behaviors (Grewal et al., 2017). The study focuses on five facets in understanding managing the consumer behavior shifts; they are technology and tools to facilitate decision making, visual display and merchandise offer decisions, big data collection and usage, analytics and profitability, and consumption and engagement, implying that retailers may choose various technologies to embrace their customers. Although the two studies seemingly explore more on the shifts and trends in consumer behavior, their findings imply that knowledge in pure human behavior when consuming goods and services, as it is crafted in Consumer Behavior courses, is no longer the single option in defining the future trends in retailing.

In line with the above-mentioned perspectives, the advancement of retailing management can be viewed as a close relationship between the macroenvironment and the microenvironment (Levy et al., 2019). The macroenvironment includes technological, social, ethical, legal, and political factors on retailing, whereas the interaction between the retailer's competitors and customers is deemed as the microenvironment (Levy et al., 2019). The latest perspective implies that there are a series of decisions when dealing with the retailing environment.

Based on a scant literature review, there is a specific managerial decision-making process in dealing with a retail business. They are: 1.) Understanding and directing the consumer buying behavior; 2.) Setting financial objectives; 3.) Determining merchandise assortment; 4.) Spotting locations; 5.) Pricing strategy, and 6.) Store management (Levy et al., 2019; Schroeder, 2002). How do the six decisions have something in common with the two previously mentioned studies? (Grewal et al., 2017, 2018) Table 1 summarizes the implied decision grouping in retailing management, with reference to the six retailing decisions. As presented in Table 1, for example, by looking at the first retailing decision feature of Grewal et al. (2017) study (see column 3 of the Table 1), "Technology and Tools to Facilitate Decision Making", it comprises and is closely related with four retailing decisions as coined by Schroeder (2002) and Levy et al. (2019); understanding and directing consumer buying behavior, setting a financial objective, determining merchandise assortment, and pricing strategy. Similarly, all the retailing decisions of the two studies Grewal et al. (2017) and Grewal et al. (2018) can also be justified into the six retailing decisions.

Table 1. The Implied Decision in Retailing

Retailing decision based on consumer preference shift and technology advancement (Grewal et al., 2018) (1)	Grouping on retailing decision (Levy et al., 2019; Schroeder, 2002) (2)	Retailing decision based on the consumer preference shift (Grewal et al., 2017) (3)
1. Agile delivery system (Decision 1, 4, 5) 2. Television shopping (Decision 1, 3, 6) 3. Electronic retailing (Decision 1, 3, 6) 4. Multichannel retailing (Decision 1, 3, 4, 5, 6) 5. Geographic Information System (GIS) technology (Decision 1, 4) 6. Customer relationship management systems (Decision 1, 3, 6) 7. Radio rrequency ID (Decision 1, 3, 4) 8. Website design (Decision 1, 3, 6) 9. In-store kiosk (Decision 1, 3, 6) 10.Digital signage (Decision 1, 6) 11.Social media (Decision 1, 6) 12. Mobile tetailing (Decision 1, 3, 6) 13.Big fata and retailing analytics (Decision 1, 2, 3, 4, 5, 6) 14.Omnichannel retailing (Decision 1, 3, 4, 5, 6) 15.Robotics (Decision 1, 6)	Decision 1: Understanding and directing the consumer buying behavior Decision 2: Setting financial objective Decision 3: Determining merchandise assortment Decision 4: Spotting locations Decision 5: Pricing strategy Decision 6: Store management	1. Technology and tools to facilitate decision making (Decision 1, 2, 3, 5) 2. Visual display and merchandise offer decisions (Decision 1, 3, 6), 3. Big Data Collection and Usage (Decision 1, 2, 5), 4. Analytics and profitability (Decision 1, 2, 3, 4, 5), 5. Consumption and engagement (Decision 1, 3, 6)

Possibly the comprehension of consumer preference shift or the consumer behavior that seems to be sufficient for students in understanding the retailing management decisions should not be deemed as a strong assumption. The perspective is in line with the implied conclusion as presented in Table 1, that the advancement in retailing is not only triggered by the preference shift of consumers (see column 3 of the table); the technology advancement also has a critical role in shaping the retail business (see column 1 of the table). At this standpoint, there is a dubious thought that trends in retailing are formed mainly by the dynamic change of consumer behavior, implying that the mastery or comprehension in the consumer behavior can be associated with the mastery of the other retailing decisions. This article is aimed to test whether the student mastery in consumer behavior has a strong association with the mastery of the other five retailing decisions.

The six retailing decisions process (Levy et al., 2019; Schroeder, 2002) is best under-stood when presented in sequential order. It starts from understanding consumer buying behavior and is followed by setting a financial objective, determining merchandise assortment, spotting locations, pricing strategy, and store management, respectively. Purposedly, such an approach would also provide a brief explanation of what is needed to hold up each retailing decision. Describing the consumer buying behavior decision starts from the discussion about the buying process, beginning when customers recognize an unsatisfied need. Then to seek information about how to satisfy the

need: what products might be useful and how they can be bought. In some situations, customers spend considerable time and effort selecting a retailer and evaluating the merchandise. In other situations, buying decisions are made automatically with little thought.

In sum, there are three types of customer decision making processes; they are extended problem solving (when risks are perceived as a consequence of purchasing the merchandise), limited problem solving (when the customers have had some prior experience with the product or service and their risk is moderate), and habitual decision making (when decisions aren't very important to customers and involve familiar merchandise they have bought in the past) (Levy et al., 2019). Thus, Retailing Decision 1 is understanding and directing the consumer buying behavior. The key indicator to sustaining the decision is how retailers define customer choices in goods and services (either by deep thinking, shallow thinking, or habitual bases).

From the retailer's perspective, once the financial objectives are set, the retailer starts determining what to buy (Nielsen et al., 2012). Financial plans start at the top of the retail organization and are broken down into categories, while buyers and merchandise planners develop their own plans and negotiate up the organization. Top management looks at the overall merchandising strategy. They set the merchandising direction for the company by defining the target market, establishing performance goals, and deciding which merchandise classification deserves more or less emphasis. The process of trading off variety, assortment, and backup stock of the merchandise is called assortment planning (Levy et al., 2019). In sum, Retailing Decision 2 is setting financial objectives along with its key indicator of how the merchandise assortment strategy meets the profit objective. Further, Retailing Decision 3 determines merchandise assortment, which has a key indicator of how retailers define their customer preference when establishing their merchandise assortment.

The next decision is to spot a retail location. In making store location decisions, retailers must examine the three-level decisions: region (it refers to the part of the country), trade area (a contiguous geographic area that accounts for the majority of a store's sales and customers), and specific site (Chopra & Meindl, 2019; Levy et al., 2019). To accomplish these three location decisions sequentially, first, the retailers should look at the factors that affect the attractiveness of a particular region and trade area. Then the retailers examine what they look for on a particular site. Naturally, the most important factor in choosing a site is the potential amount of sales it can generate. The fourth retailing decision is all about spotting locations, and the related key indicator of the decision is how retailers define the attractiveness of retail locations based on regional trade area and specific site perspective.

In setting prices, under the cost-oriented method, the retail price is determined by adding a fixed percentage to the cost of the merchandise. With the demand-oriented method, prices are based on what customers expect or are willing to pay. With the competition-oriented method, prices are based on competitor's prices (Levy et al., 2019). Retailers need to consider costs, demand, and competition in setting the price. The cost-oriented method would be the starting point for setting a price. The competition-oriented method provides an outside check on the marketplace. The demand-oriented method is then used for fine-tuning the strategy. Retailers are advised to start with a price based on costs and their profit goals, consider competition, and then perform tests to determine if it's the most profitable price (Levy et al., 2019). The possible-derived Retailing Decision 5 is pricing strategy, and it is sustained by the way retailers define cost and profit plans, competitions, and fine-tuning between the two.

The final decision in retailing is store management. It comprises human resource management and managing the store operations. Human resource management is important in retailing because employees play a major role in performing a critical business function. Retailers still rely on people to perform the basic retailing activities such as buying, displaying merchandise, and providing service to customers. One human resource management measure controlling people's performance is employee productivity; that is, the retailer's sales or profit is divided by the number of employees. Employee productivity can be improved by increasing sales generated by employees, reducing the number of employees, or both. While employee productivity is directly related to the retailer's short-term profits, employee attitudes such as job satisfaction and commitment have important effects on customer satisfaction and subsequent long-term performance of the retailer. In addition to employee

survey measures of these attitudes, a behavioral measure of these attitudes is employee turnover (Colquitt et al., 2019; Levy et al., 2019).

To manage the retail stores, the responsibilities of store managers are divided into four major categories: managing employees, controlling costs, managing merchandise, and providing customer service (Cox & Brittain, 2004; Dunne et al., 2013; Levy et al., 2019; Schroeder, 2002). While an important objective of store managers is increasing the revenues generated by employees, managers also increase their stores' profits by reducing costs. The major costs are the compensation and benefits of employees. But store managers also need no control over maintenance, energy costs, and inventory loss due to shoplifting and employee theft (Levy et al., 2019). In general, the 6th Retailing Decision is store management. The key indicator to sustaining the decision is how retailers develop their perspectives in deploying people to manage the store.

The literature review on the above mentioned six major decisions in managing retail business implies that when students are exposed to the general marketing management or salesmanship courses, which equip students with deep knowledge on consumer buying behavior, we argue that it is hard to predict that they will automatically comprehend the other five decisions as each decision has unique complexity that needs various approach to cope with rather than a single perspective on consumer buying behavior or, in other words, the retailing decisions would not easily be managed just because of the deep knowledge in consumer buying decisions. The argument also refers to the various jobs performed in the retailing industry. Each job reflects the various and unique retailing decisions. The jobs perform an array of decisions processes to sustain the business.

RESEARCH METHOD

The sample of this research was final year students of an Indonesian state-owned vocational college majoring in Marketing Management. The sampling frame was fit for the research purpose, as: 1.) The final year students had learned all the marketing courses entirely; and 2.) They had gone through several marketing project assignments when attending the courses, thus consequently, they had been experiencing all marketing decisions delivered in the marketing courses at the school.

The data (it comprised of responses to the series of open questions) was collected when the students attended a full-day training in retailing management. A Series of questions covering the previously derived six decisions in retailing management (Levy et al., 2019; Schroeder, 2002) were distributed to those 58 participants (see the detailed questions in Appendices of this article). As the research employed nonparametric or population distribution-free techniques, such as a very small sample size, it implied that the nonparametric techniques do not have to follow the strict assumption to estimate the population (Israel, 2008). An expert panel of three members then evaluated and provided scores on the participants' responses.

The sample questions were "could you mention several merchandises to buy on a deep-thinking basis, and why is it so" (consumer buying behavior), "What sort of menu do you offer if you were a restaurant owner" (determining merchandise assortment), "Which site do you think is better off if you have a car showroom" (site selection), "How do you manage a profit of a grocery store" (setting financial objectives), "What is your suggestion in determining staff composition in a retail toy store" (human resource management), "Could you mention the major problems when managing a grocery store" (managing store), and "what would you do when you set a merchandise price" (setting the price).

Firstly, the Chi-square test was employed to compare participants' best scores of the retailing decision frequencies against their expected frequencies (Israel, 2008). The null hypothesis was "there was no difference in the proportion of participants mastery in retailing decisions". This was to test whether participants tended to master certain retailing decisions. Next, the Mann-Whitney U test was utilized to evaluate whether participants with good mastery in a specific decision were also excelled to those of the other decisions (Israel, 2008).

RESULT AND DISCUSSION

First, based on participants' scores (ranging from 0 to 100 scale), we assessed the proportion of participant mastery on each decision (Table 2). Table 2 shows the proportion of students that excelled in certain retailing decisions. As it was predicted, students had deeper knowledge in understanding consumer buying behavior (57%) and pricing strategy (39%). Twenty-nine students, out of 51, we're good at understanding consumer buying behavior.

A Chi-Square Test (Table 3) with each expected frequency was above 5 for more than 20% of the total expected frequency implied that it was suitable for further analysis (Israel, 2008). Further, the Chi-Square Test of the student mastery data (Table 2) revealed that X^2 (5, 51) = 11.07, p = < 0.05, meaning that there was different mastery in retailing decisions for students, and it supported the assumption that knowledge in "understanding and directing the consumer buying behavior" (Decision 1) was the dominant mastery of the students. The finding implied that the school sample did not sufficiently equip students to deal with the retailing business.

Table 2. Participant Mastery in Retailing Decisions

Decision						Total
1 **	2	3	4	5	6	
29	0	1	20	1	0	51*
57%	0%	2%	39%	2%	0%	100%

* 7 responses were incomplete, remaining the 51 responses
**Note:
Decision 1: understanding and directing the consumer buying behavior,
Decision 2: determining merchandise assortment
Decision 3: spotting locations
Decision 4: pricing strategy
Decision 5: store management
Decision 6: setting financial objective

Table 3. Chi-Square Data Set on The Student Mastery in Retailing Decision

Decision	O	E	O – E	$(O - E)^2$	$(O - E)^2/E$
1	29	8.5	20.5	420.25	49.44
2	0	8.5	-8.5	72.25	8.50
3	1	8.5	-7.5	56.25	6.62
4	20	8.5	11.5	132.25	15.56
5	1	8.5	-7.5	56.25	6.62
6	0	8.5	-8.5	72.25	8.50
		Total			95.24

The finding also indicated the possibility that Consumer Behavior content was the major emphasis when the school delivered marketing management courses. The question was whether the courses could equip students with sufficient knowledge if they were projected as retail professionals. To elaborate on the answer, we continued the analysis to test whether mastery in "understanding and directing the consumer buying behavior" implied mastery of the other five decisions. The Mann-Whitney U test was performed to test the null hypotheses: "mastery in Decision 1 implying identical performance in other five decisions". To do so, first, we divided participant scores into two groups; one of those with high scores in consumer behavior decisions and the rest of those with low scores.

Next, we compared other retail decision scores between the groups and analyzed whether participants with high scores in consumer behavior decisions also had high scores in other decisions (Table 4). It was noted that mean-centered scores identified the high and low scores groups in Decision 1. Thus, the low scorers would have values less than zero, whereas high scorers were those with values higher than zero.

Table 4. Schedule to Compare Students' Other Mastery after Identified as High and Low Scorers in Decision 1

Retailing Decisions	Students with High Scores in Decision 1	Students with Low Scores in Decision 1	Notes
Decision 2	Scores in Decision 2	Scores in Decision 2	Pair #1
Decision 3	Scores in Decision 3	Scores in Decision 3	Pair #2
Decision 4	Scores in Decision 4	Scores in Decision 4	Pair #3
Decision 5	Scores in Decision 5	Scores in Decision 5	Pair #4
Decision 6	Scores in Decision 6	Scores in Decision 6	Pair #5

The findings revealed that mastery in Decision 2 was statistically significantly higher when one showed mastery in Decision 1 (U = 173, p = 0.031). This meant that mastery in determining merchandise assortment was higher for students with higher knowledge in consumer behavior. At the contrary, the Mann-Whitney U test also showed that the average level of Decision 3, Decision 4, Decision 5, and Decision 6 of participants were identical for students with high score in Decision 1 and those with low score in Decision 1: Decision 3: (U = 199.5, p =0.108); Decision 4: (U = 211, p = 0.138); Decision 5: (U = 268.5, p = 0.974); Decision 6: (U = 252, p = 0.424)

Nevertheless, the findings showed that having high scores in consumer behavior decisions did not automatically have the mastery of setting a financial objective, spotting locations, pricing strategy, and performing store management. The findings partially supported our prediction that the mastery in Decision 1 did not mean comprehension in other retailing management decisions. This also implied that, in general, the nature of retailing management decisions was unique and had a broader perspective from just "understanding consumer buying behavior," as learned by students in Marketing Management courses.

The findings also implied that when vocational schools establish the knowledge and skills of their students to enter the retail industry, the curriculum should cover all retailing decisions. This was possibly true as retailing had higher relation with business operations decisions, not just coping with consumer behavior decisions, as implied by the above mentioned six retailing decisions (Chopra & Meindl, 2019; Cox & Brittain, 2004; Dunne et al., 2013; Levy et al., 2019; Schroeder, 2002).

CONCLUSION

The article provided a brief explanation on the perspective that specific knowledge in marketing management (i.e., consumer behavior), did not always in line with the required knowledge in a specific field of business (i.e., retail business). Based on the findings, to understand the phenomenon, whether one specific business knowledge had a valuable feature was, first, by determining its overall decisions. Then, second, a series of analyses should be established to assess whether the decisions have any relation with the college's courses or training of a field of study. Comprehension of the process might help the vocational school to equip students with the right required knowledge and skills for a certain field of business. The overall findings yield ideas for further research, that is, to test the association between other general functional management courses and the specific decisions in various fields of business. Such an approach would, expectedly, provide vocational schools with a comprehensive map in describing the association of each management course with various decisions in many fields of business.

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Post-Occupancy Evaluation (POE) theory room of SMK in Bantul assessed from lightning and ventilation

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ABSTRACT

This study Post-Occupational Evaluation (POE), aims to determine whether the natural lighting and ventilation openings in theoretical rooms at SMK XYZ have met the standards or not. The review of technical aspects focused on lighting and ventilation issues. This research is descriptive, evaluative, with the POE method at the investigative level, making 13 theoretical rooms as research objects and 156 students or 12 students per class as research subjects. The research instrument is a measuring instrument plus a questionnaire as data to strengthen the study results. Data collection techniques with observation and recording of primary data and secondary studies. The data analysis technique used descriptive quantitative. The condition of the theoretical space at SMK XYZ for the KBM process does not meet standards, such as natural lighting of the theoretical room in 11 of the 12 existing rooms; inlet and outlet area, the elevation of ventilation holes at the inlet throughout the theory room.

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INTRODUCTION

The school line education unit must provide facilities and infrastructure that support the teaching and learning process (KBM), as stated in Law of the Republic of Indonesia Number 20 of 2003 concerning the education system Article 45 paragraph 1 states that every formal and non-formal education unit provides facilities and infrastructure that meet educational needs in accordance with the growth and development of the physical, intellectual, social, emotional, and psychological potential of students. In this way, both students and teaching staff can carry out the teaching and learning process effectively, so that maximum student learning achievement can be achieved. One of the facilities and infrastructure needed is a comfortable theory room and meets the standard needs of its users (Panero & Zelnik, 2003).

It is undeniable that a comfortable theoretical space will make the teaching and learning process more conducive (Watson, 2003). A conducive teaching and learning process will certainly have a good impact on student learning outcomes (Doelle, 1993; Watson, 2003). The conducive physical condition of the study room includes; adequate lighting, good air circulation, minimal noise, and adequate facilities and infrastructure to support a study group. The physical condition of the theoretical space largely has an influence on the possibility of disturbance. Inadequate natural

lighting, room temperature that is too hot can reduce most of the students' ability to concentrate on the subject matter, although this often escapes the attention of teachers and school administrators (Septiani, 2015).

As is the case in SMK XYZ, based on observations made, the KBM process in the theory room tends to run less conducive. The teaching and learning activities in the theory room are disturbed by the heat and stuffiness in the theory room during the day. Even though teak trees surround the school environment, some theory rooms are very dark even during the day and have to use lighting from lamps. These problems affect the teaching and learning process, which becomes less conducive.

Based on these brief observations, a review or evaluation of the theoretical space at SMK XYZ is needed, which is expected to provide knowledge to related parties to be improved in the future. It is planned that the study on this object will be carried out using the POE method. According to Sudibyo (in Prawitasari, 2019), Post Occupancy Evaluation (POE) is an activity in the form of reviewing (evaluating) the buildings and the built environment that has been inhabited. This evaluation serves to determine the actual condition of the building in the field after being occupied. Then the results will be used as input and improvements for better building designs in the future. Post-Occupational Evaluation (POE) is divided into three main problems, namely technical, functional and behavioral (Elfajri, 2016; Raihan, 2018).

The technical aspects of POE itself include structure, sanitation, ventilation, fire safety, electrical, exterior walls, interior finishing, roofing, acoustics, lighting, and environmental control systems (Preiser et al., 2015). Judging from the problems in the theoretical room at SMK XYZ, POE can examine problems in technical aspects, which include lighting and ventilation. In addition, there are three levels in conducting POE. The first indicates the success and failure of the building, carried out in a short time (approximately 3 hours) (Cannon & Edmondson, 2005). The second is investigative, namely identifying the success and failure of the building, then the data is compared with applicable standards, usually done for 2-4 weeks. Third diagnostic using data collection techniques and perfect analysis techniques that produce investigative and indicative POE (Gonzalez-Caceres et al., 2019). Sometimes evaluations of this level attempt to develop results that indicate relationships between variables, monthly to annual time. In this research, the aspects that will be reviewed are technical and functional at the indicative level. Evaluation of technical aspects will focus on the problem of natural lighting and ventilation (Hauge et al., 2011).

The lighting that will be studied is natural lighting. Lighting is one thing that is very important for humans to get a safe and comfortable living environment, according to Satwiko (2008), the sun is the main source of natural light for the earth. Natural lighting in the building is used to illuminate the building from sunrise to sunset. Natural light from the sun is also good for human health. Natural lighting is divided into two, sunlight, direct sunlight, which generally has a narrow spread of light and high intensity. Daylight, indirect sunlight, atmospheric particles, including clouds that scatter sunlight onto the earth. Each room certainly has different light intensity requirements. Therefore it is necessary to have an appropriate lighting system according to the needs of the space.

Table 1. Standards for Requirements for the Light Level of Each Room (Lux)

No.	Activities (Office and School)	Illumination (Lux)
1	Office	300
2	Conference room	300
3	Ordinary public office	500
4	Indoor general office	1000
5	General office drawing room	1000

The natural daylight factor (FPASH) at a point in the room is the ratio between the horizontal illumination in the indoor work area (Ei [lux]) to the horizontal illumination in the outdoor open field (Eo [lux]) at the same time. Minimum FPASH measurements are carried out at one main measuring point (TUU) and two side measuring points (TUS), all at the height of 75 cm from the floor and at a

distance of d/3 (d= room depth) from the plane where there is a light hole. TUU is in the middle of the two side walls, while TUS is each 0.5 meters from the nearest sidewall.

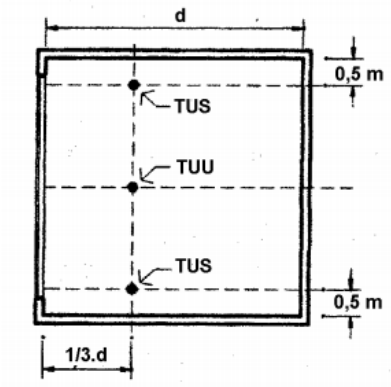

Figure 1. TUU, TUS, and d

In addition to the ventilation lighting in the SMK XYZ, it is studied to find out whether it has been made and functions effectively to circulate air in the theoretical room. Ventilation itself is the flow of air, both in open and closed spaces, according to Satwiko (2008), based on the condition of the theoretical room in SMK XYZ, which not all classes have a fan that functions properly review will focus more on natural ventilation. Natural ventilation is the process of changing room air by fresh air from outside without the help of mechanical equipment (Satwiko, 2008). The things that will be reviewed on the ventilation holes in the theory room are the orientation of the openings, the position or elevation of the ventilation holes, the dimensions of the ventilation holes, the type of openings, and the direction of the openings.

The position of the ventilation hole that functions for the entry of air (inlet) should be placed at the height of the human activity. One of the good openings is that there must be cross ventilation. By providing openings on both sides of the dining room will provide an opportunity for air to flow in and out. At the same time, the ventilation holes that function for the exit of air (outlet) should be placed higher (above the height of human activity) so that hot air can exit easily without being mixed with fresh air entering from the inlet. The height of human activity in the room is approximately 60-80 cm (sitting activity) and 100-150 cm (standing activity) (Mediastika, 2005). To reduce indoor air temperature, massive wind movement is needed (Linden, 1999). With the difference in inlet and outlet openings, the air pressure outside and inside the room changes to enter the room.

Table 2. Ratio of Increase in Aperture Dimensions

No.	Ratio	Enhancement (%)
1	1 : 1	0
2	1,1 : 1	17.5
3	2 : 1	26

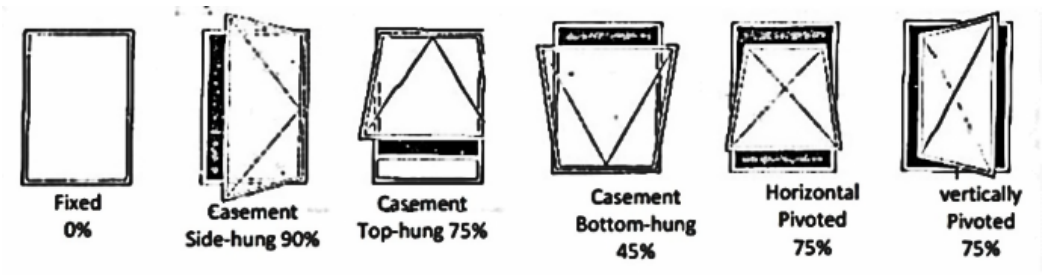

Figure 2. Aperture Design

Based on SNI 03-6572-2001, the natural ventilation provided must consist of permanent openings, windows, doors, or other facilities that can be opened with the following criteria: 1.) The number of ventilation openings is not less than 5% of the floor area of the room that requires ventilation; and 2.) The direction faces a walled courtyard of a suitable size or an area that opens up. In addition, the type of opening also affects the direction of the air in the room. A good window type is one that can circulate air with the largest percentage, namely the casement side-hung type with a percentage value of 90% (Sari et al., 2021).

RESEARCH METHOD

This study uses a descriptive evaluative at the investigative level in the POE method with a quantitative approach. This research was conducted over a period of one month, from April 26 to May 26, 2018. The population of this research is all the theoretical rooms in SMK XYZ, as many as 13 rooms. Data collection techniques by observing and recording primary data are measurements, data depictions or photo recordings of the conditions and specifications of theoretical spaces, and secondary studies using library documents and documents regarding existing theoretical spaces as study material. This research instrument uses measuring instruments in the form of a 3 m and 50 m meters, camera, lux meter (Lutron LX-107). The data analysis technique used descriptive quantitative.

RESULT AND DISCUSSION

Daylight, the measurement of the brightness of natural lighting (illumination) in theoretical rooms at SMK XYZ, was carried out at 07.00 AM (6.50 - 07.10 AM) WIB and 12.00 PM (11.00 AM - 12.00 PM) WIB and was taken from light sources from the inlet and outlet openings. The measurement uses a Luxmeter with the Lutron LX-107 brand by choosing the smallest scale, which is 2000 in LUX units. Lighting data retrieval is limited to Luxmeter measurement with one-time data collection without considering weather conditions and moon position. The measurement results are presented in the following Table 3.

Table 3. Natural Lighting Measurement Results at 7.00 AM (6.50 - 07.10) GMT+7

Room	lane	Illumination E (LUX)		
		TUS 1 (Side Measuring Point) 1	TUU (Main Measuring Point)	TUS (Side Measuring Point) 2
R1	North	160	500	220
	South	84	111	115
R2	North	98	118	58
	South	44	50	53
R3	North	10	47	32
	South	8	16	17
R4	North	0	0	0
	South	0	0	0
R6	East	22	16	14
	West	25	32	19
R7	East	17	14	13
	West	16	18	20
R8	East	59	30	32
	West	33	34	19
R9	West	18	28	23
	East	8	12	22
R10	West	10	10	10
	East	4	5	3
R11	East	123	186	115
	West	29	23	20
R12	East	37	35	62
	West	5	3	0
R13	South	55	32	34
	North	44	143	124

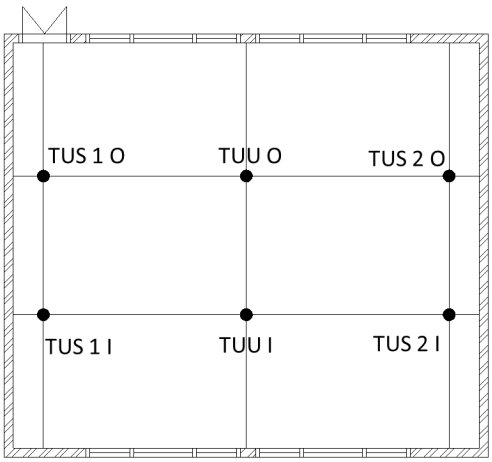

Figure 3. TUS and TUU Data Collection Points

The data from the measurements in the field are classified into the following four categories, such as the situation felt during the research: Dark (Da) < 50 Lux, Dim (Di) 50-250 Lux, Bright (B) 250 – 350 Lux, Very Bright (VB) >350 Lux. The standard of room lighting, according to Hartono Poerbo (1992:61) for schools is 300 Lux, but in this case, it is estimated that a comfortable room lighting for learning activities in a theoretical room is between 250 Lux to 350 Lux. Based on measurements using a Lux meter for natural lighting at 07.00 WIB, all the rooms that became the object of the study did not meet the lighting standards, four rooms were classified as dim, and eight rooms were classified as dark.

Table 4. Average Natural Lighting from Outlet and Inlet Natural Lighting at 7.00 AM (6.50 AM - 07.10 AM) GMT+7

Room	Illumination E (LUX)			
	lane	TUU Average	TUU average O and I	Category
R1	O	293.33	198.33	Di
	I	103.33		
R2	O	91.33	70.17	Di
	I	49		
R3	O	29.67	21.67	Da
	I	13.67		
R4	O	0	0.00	Da
	I	0		
R6	O	17.33	21.33	Da
	I	25.33		
R7	O	14.67	16.33	Da
	I	18		
R8	O	40.33	34.50	Da
	I	28.67		
R9	O	23	18.50	Da
	I	14		
R10	O	10	7.00	Da
	I	4		
R11	O	141	82.67	Di
	I	24		
R12	O	44.67	23.67	Da
	I	2.67		
R13	O	40.33	72.00	Di
	I	103.67		

Table 5. Average Natural Lighting from Outlet and Inlet Natural Lighting at 12.00 PM (6.50 AM - 07.10 AM) GMT+7

Room	lane	E illumination (LUX) TUU Average	TUU average O and I	Note.
R1	O	978	847.165	VB
	I	716.33		
R2	O	696	540.665	VB
	I	385.33		
R3	O	57.67	37.67	Da
	I	17.67		
R4	O	0	0	Da
	I	0		
R6	O	31.33	31.83	Da
	I	32.33		
R7	O	55.33	45.83	Da
	I	36.33		
R8	O	101.67	78.335	Di
	I	55.00		
R9	O	122.33	85.33	Di
	I	48.33		
R10	O	61.33	39,665	Da
	I	18		
R11	O	102.33	79.83	Di
	I	57.33		
R12	O	89.33	70	Di
	I	50.67		
R13	O	274.67	286.67	B
	I	298.67		

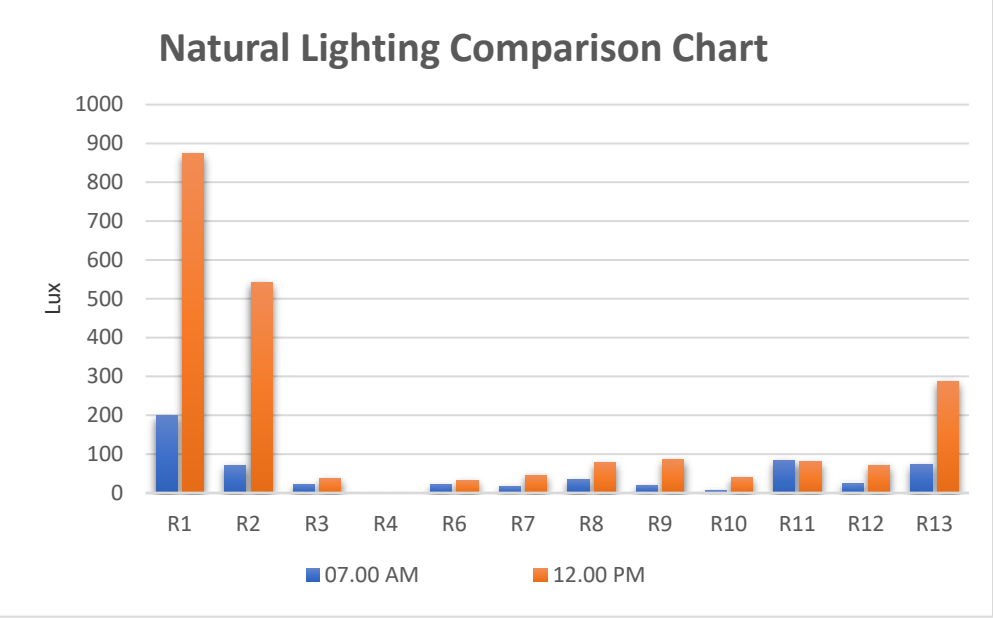

Figure 4. Graph of Comparison of Natural Lighting Measurement Results at 07.00 AM (GMT+7) with 12.00 PM (GMT+7)

The standard of room lighting, according to Poerbo (1992) for schools is 300 Lux, but in this case, it is estimated that a comfortable room lighting for learning activities in a theoretical room is between 250 Lux to 350 Lux. Based on measurements using a Lux meter for natural lighting at

07.00 WIB, all the rooms that became the object of the study did not meet the lighting standards, four rooms were classified as dim, and eight rooms were classified as dark.

Measurements at the time range at 12.00 WIB obtained the results of 2 rooms, namely room R1 and R2 exceeding the lighting standard, excess natural light that enters brings heat which affects the room's stuffiness, even before 7.00 it feels hot as respondents stated in the Questionnaire. R13 already meets lighting standards, and R3, R4, R6, R7, R8, R9, R10, R11, and R12 spaces do not meet room lighting standards. The analysis results above are only the theoretical room R13 or only 1 (8.33%) of the total 12 rooms at 12.00 WIB that meet the comfort standard.

The graph of the comparison of the results of natural lighting measurements at 07.00 WIB with 12.00 WIB shows an increase in the strength of the lighting in each room, except for R11 there is a decrease and in-room R4 it does not show an increase in lighting strength.

Table 6. Natural Lighting Measurement Results 12.00 Hours (11.00 AM - 12.00 PM) GMT+7

Room		Illumination E (LUX)		
	lane	TUS 1	TUU	TUS 2
R1	O	811	1158	965
	I	667	626	856
R2	O	617	864	607
	I	384	412	360
R3	O	17	101	55
	I	15	20	18
R4	O	0	0	0
	I	0	0	0
R6	O	38	31	25
	I	33	30	34
R7	O	51	56	59
	I	31	40	38
R8	O	110	108	87
	I	65	54	46
R9	O	85	127	155
	I	34	47	64
R10	O	68	52	64
	I	17	21	16
R11	O	133	95	79
	I	60	69	43
R12	O	115	87	66
	I	60	56	36
R13	O	334	292	198
	I	248	342	306

R : Room
TUU : Main Measuring Point
TUS : Side Measuring Point
I : Inlet
O : Outlet

The type of window used is a top-hug casement that can circulate air with a percentage of 70%. The window elevation in the table is the window elevation from the floor. This ventilation data retrieval is to find out how influential ventilation is on the hot air temperature in theoretical rooms at SMK XYZ. This ventilation review is limited to the opening area and opening height without other data on thermal comfort, namely air humidity, air temperature, wind speed, and clothing.

Table 7. Inlet Dimensions

R	Inlet			
	Length (cm)	Width (cm)	Elevation (cm)	Amount
R1	75	98	102	6
R2	75	98	102	6
R3	68	98	135	6
R4	68	98	135	6
R5	-	-	-	-
R6	68	98	130	6
R7	68	98	130	6
R8	68	98	130	6
R9	68	98	113	6
R10	68	98	113	6
R11	68	98	116	6
R12	68	98	116	6
R13	68	98	125	6

Table 8. Outlet Dimensions

R	Outlet window			
	Length (cm)	Width (cm)	Elevation (cm)	Amount
R1	75	98	102	4
R2	75	98	102	4
R3	70	60	143.5	4
R4	70	60	143.5	4
R5	-	-	-	-
R6	70	60	144	4
R7	70	60	143	4
R8	70	60	143	4
R9	70	60	138	4
R10	70	60	138	4
R11	70	60	133	4
R12	70	60	133	4
R13	70	60	140	4

Table 9. Area of Aperture in Each Theory Room (Inlet)

R	Inlet			
	Length (cm)	Height (cm)	Amount	Ventilation area (m2)
R1	75	98	6	4.41
R2	75	98	6	4.41
R3	68	98	6	4
R4	68	98	6	4
R6	68	98	6	4
R7	68	98	6	4
R8	68	98	6	4
R9	68	98	6	4
R10	68	98	6	4
R11	68	98+40	6	6.45
R12	68	98+40	6	6.45
R13	68	98	6	4

Table 10. Area of Aperture in Each Theory Room (Outlet)

R	Outlet				
	Length (cm)	Height (cm)	Amount	Ventilation area (m2)	Inlet+Outlet Area (m2)
R1	75	98	4	2.94	7.35
R2	75	98	4	2.94	7.35
R3	70	60	4	1.68	5.68
R4	70	60	4	1.68	5.68
R6	70	60	4	1.68	5.68
R7	70	60	4	1.68	5.68
R8	70	60	4	1.68	5.68
R9	70	60	4	1.68	5.68
R10	70	60	4	1.68	5.68
R11	70	60+40	4	3.36	9.81
R12	70	60+40	4	3.36	9.81
R13	70	60	4	1.68	5.68

The area of the opening in the inlet is larger than the outlet in the entire theoretical space. It is less effective for the entry and exit of the wind in the space because it makes the wind speed in the room low, which affects the stuffiness of the theoretical room. It would be better if the inlet opening area was smaller so that the wind movement would be more massive to lower the indoor air temperature.

Table 11. Opening Presentation Present

R	room area (m2)	Ventilation (m2)	Percentage (%)	Standard (%)	Note
R1	60.92	7.35	12.07	5	Fulfill
R2	60.66	7.35	12.12	5	Fulfill
R3	61.29	5.68	9.27	5	Fulfill
R4	61.15	5.68	9.29	5	Fulfill
R6	60.78	5.68	9.35	5	Fulfill
R7	60.44	5.68	9.40	5	Fulfill
R8	60.26	5.68	9.43	5	Fulfill
R9	58.70	5.68	9.68	5	Fulfill
R10	58.67	5.68	9.68	5	Fulfill
R11	69.48	9.81	14.12	5	Fulfill
R12	69.72	9.81	14.07	5	Fulfill
R13	61.12	5.68	9.29	5	Fulfill

Based on the calculation of the percentage of the opening area of the entire theoretical space, which is the object of research, the overall minimum standard of openings is 5%, so all theoretical spaces that are the object of research at SMK XYZ have met the standards of SNI 03-6572-2001. Elevation of ventilation holes that function for air entry (inlet) should be placed at the height of human activity. Ventilation holes that function for the exit of air (Outlet) should be placed higher (above the height of human activity) so that hot air can exit easily without being mixed with fresh air entering from the inlet. The height of human activity in the room is approximately 60-80 cm (sitting activity) and 100-150 cm (standing activity).

The results of the comparison of data in the field with the standard show that the height of the entire inlet opening exceeds the standard, and the outlet opening meets the standard. The inlet opening that exceeds the user's activity (sitting activity) has an impact on the wind from the inlet flowing above human activities and cannot reach human activities below it.

Table 12. Ventilation Hole Elevation (Inlet)

Room	*Inlet*		
	Height (cm)	Standard(cm)	Note.
R1	102	60 – 80	Exceed
R2	102	60 – 80	Exceed
R3	135	60 – 80	Exceed
R4	135	60 – 80	Exceed
R6	130	60 – 80	Exceed
R7	130	60 – 80	Exceed
R8	130	60 – 80	Exceed
R9	113	60 – 80	Exceed
R10	113	60 – 80	Exceed
R11	116	60 – 80	Exceed
R12	116	60 – 80	Exceed
R13	125	60 – 80	Exceed

Table 13. Ventilation Hole Elevation (Outlet)

Room	Outlet		
	Height (cm)	Standard(cm)	Note.
R1	102	>80	Fulfill
R2	102	>80	Fulfill
R3	143.5	>80	Fulfill
R4	143.5	>80	Fulfill
R6	144	>80	Fulfill
R7	143	>80	Fulfill
R8	143	>80	Fulfill
R9	138	>80	Fulfill
R10	138	>80	Fulfill
R11	133	>80	Fulfill
R12	133	>80	Fulfill
R13	140	>80	Fulfill

In rooms R1 and R2, the inlet and outlet openings are the same height, resulting in hot air not being able to escape easily and possibly being mixed with fresh air entering from the inlet. The same aperture height was identified as a result of the stuffiness of the theoretical space at R1 and R2.

As for the room that does not meet the standard of room lighting for schools, it is necessary to add artificial lighting in the form of lights. The addition of artificial light needs to be taken into account in order to obtain sufficient lighting results for the teaching and learning process in schools. For a room that gets excessive lighting, you can add vegetation to the front of the room. Vegetation is useful for blocking some of the light that will enter, can also reduce the heat of natural light from the sun and as a barrier from noise. Vegetation placement is recommended along the front area of space R1, R2, R6, R7, R8, R9, R10, R11, R12, and R13. In addition, it is also on vacant land facing R2, R11, and R12. The ventilation that has been installed cannot be changed. Therefore, artificial ventilation in the form of a fan or air conditioner will greatly help reduce the stuffy air in the room.

In order to meet natural lighting as needed, it is necessary to design natural lighting according to the SNI Guidelines for natural lighting procedures in buildings, 2001. The placement of the theoretical room should be avoided from aisles that are closed on two sides of the area where light enters because the gaps in the entry of natural lighting are more a little. The placement of ventilation openings for light in the theory room should not be in direct contact with open spaces without barriers (open fields, vacant land) because the incoming light is not filtered. Solar heat may enter the room directly and make the room hot. If you are forced to face an open space, then you should be given vegetation as a filter for excess heat and light.

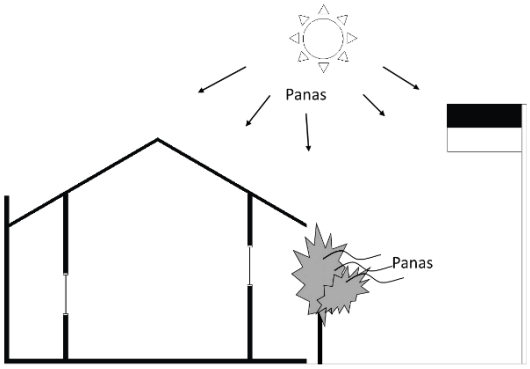

Figure 5. Illustration of Ventilation Openings Directly Opposite The Field with Vegetation

The theoretical space must be placed east-west so that in the morning and evening, sunlight does not enter directly into the theoretical space. Direct light that enters causes excessive heat and lighting in the theory room. Therefore it is necessary to avoid laying the building that functions as a north-south longitudinal theory room. The location of the SMK XYZ building is in the southern part of the equator, so the building located in the east-west direction gets direct light only from the north so that the handling of excess lighting in the theoretical room will be more efficient because it only focuses on the north.

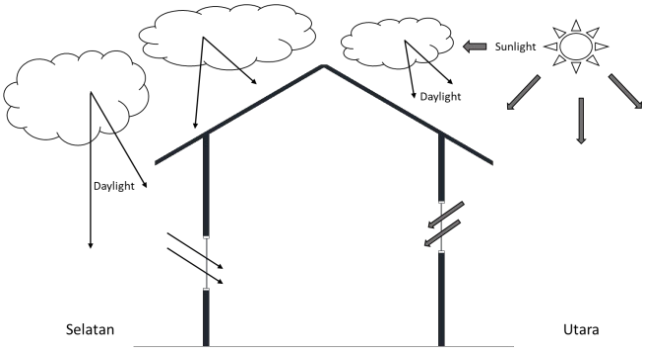

Figure 6. East-West Longitudinal Building

The position of the ventilation hole that functions for the entry of air (inlet) at SMK XYZ is located above human activities so that the incoming wind cannot reach humans in the room. In future developments, the position of the inlet ventilation hole should be placed at the height of human activities and the outlet should be placed higher (above the height of human activity) so that hot air can exit easily without being mixed with fresh air entering from the inlet.

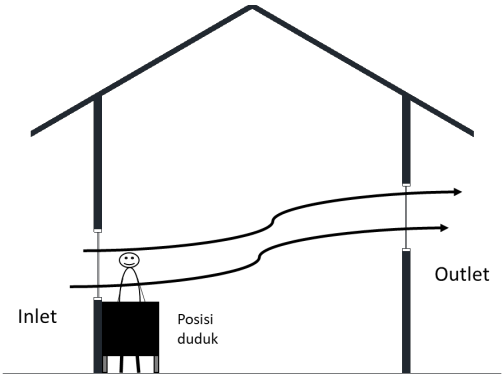

Figure 7. The Position of The Inlet is Located at The Height of Human Activity

In the case that occurred in SMK XYZ, the inlet is larger than the outlet. The movement of the wind in the room should be more massive. The inlet ventilation hole should have smaller dimensions to reduce the air temperature in the room (Zhang et al., 2016).

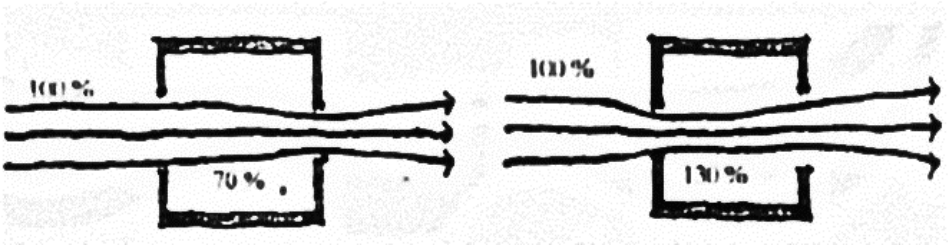

Figure 8. Differences in Inlet and Outlet Dimensions Affect Wind Speed in Buildings

CONCLUSION

Based on the data in this study, it can be said that there are still many theoretical spaces that do not meet the standards, such as; natural lighting of the theoretical room in 11 of the 12 existing rooms; Inlet and Outlet area; Elevation of ventilation holes at the inlet throughout the theory room. Students can directly feel this during the teaching and learning processeThis resulted in the teaching and learning process because the class was not conducive. In addition, the process of delivering material from the teacher to students is not optimal because the focus of students is divided. Previous research has been done by other researchers regarding thermal comfort in the image space in one of the vocational schools. The research was conducted because, at certain hours, there was an increase in temperature in the drawing practice room. This is certainly very disturbing to the comfort of students when drawing activities.

This kind of research will be very meaningful for repairing and overcoming the occurrence of similar problems in the future, which are stated in the following curative and preventive suggestions: 1.) Curative Advice, with this post-occupancy evaluation research on the theoretical room at SMK XYZ, the addition of lighting facilities is a curative step towards rooms that lack natural lighting. Then, vegetation can be added in front of the room as a light barrier for rooms that receive excess lighting and reduce the incoming heat. For thermal comfort, it is better to add an air conditioner or fan to cope with a room that is too hot. Equipment replacement also needs to be done gradually so that students also feel comfortable when using it. In addition, it also needs to rearrange the furniture and function of the room. As much as possible, the workshop space is kept away from the theory room so that the teaching and learning process is not disturbed by noise from the workshop; and 2.) Preventive Advice, the design of lighting needs, ventilation, layouts in buildings should be guided by existing standards to avoid the same lighting problems in the next building construction.

The limitation of this study is that when the research process coincides with the time of the end of the semester exam, which affects the measurement data, there is a need for further research on the teaching and learning process to obtain more accurate and targeted data..

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Realizing the demand-driven paradigm in vocational education: A case study on vocational high school teaching-industry partnership program

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ABSTRACT

The teaching-industry partnership program between schools and industry could be a good alternative to be implemented in vocational education. This research aims to describe the collaboration pattern between Vocational High School (VHS) and its industry partner. This research was conducted using the case study qualitative research method. The data were collected through in-depth interviews, observations, and documentation. The informants were teachers, the head of the motorcycle-technician department, trainers from the industry, and senior technicians of the motorcycle maintenance workshop selected based on purposive sampling. The results show that in order to operate well, the program requires: 1.) A close relationship between the school and the industry; 2.) Agreement to share knowledge, skills, equipment, and funding between the two parties; and 3.) The willingness of the school to integrate industrial specificity into the learning system. This study also finds that the program just partially aligned with the demand-driven paradigm. Conformity has been realized in terms of preparing graduates' competence following the industry's need, but not yet in terms of the number of graduates required by the company. Any method in increasing the conformity between the labor demand and supply still needs further study.

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INTRODUCTION

The alignment of the world of education with work is a problem in many countries. This form of disharmony can be seen from the high unemployment rate. In Indonesia, for example, in May 2019, the national open-unemployment rate was still at 5.01%, while 57.27% of the working population was working in the informal sector (Suhariyanto, 2019). This disharmony between the world of education and the world of work can also be in the form of a mismatch of education with jobs obtained by graduates (Robst, 2007; Senarath et al., 2017). Therefore, aligning the world of education with the world of work is a must for all countries to develop a healthy national economy.

Alignment is the compatibility between the labor market and those produced by educational institutions. The alignment contains aspects of quality, quantity, location, and time (Slamet, 2014). Quality aspects are related to the level of competence of graduates compared with the needs of the workforce. The quantity aspect is related to the number of graduates compared to needs. The location aspect is related to the geographical position of labor-producing institutions with industries in need. The time aspect is related to the projected time of workforce needs with the production of the workforce. Graduates with excellent competence but present at the wrong time are also issues that must be anticipated (Liu et al., 2012). The World Economy Forum recommends building social

partnerships to create a match between graduates' skills and the world of work (Klosters, 2014). This partnership will increase the competence of graduates and enable them to obtain better jobs for graduates.

To realize conformity between schools and the world of work, the educational development paradigm must be demand-driven rather than supply-driven. The purpose of education based on the demand-driven paradigm is that the substantial competencies needed by the world of work have been formulated and followed by concrete efforts to produce skilled workers to meet the demands of the world of work (Tugu Jojga, 2018). In reality, the demand-driven paradigm of vocational education cannot yet be fully implemented in most countries' education systems. However, although it is still sporadic, efforts to realize link-and-match between vocational schools and the industrial world is continuing.

One such effort is the teaching industry, which is the industry entering into the educational process in vocational school partners in producing prospective graduates who are ready to work following the competency qualifications required by the industry. The term teaching-industry has the same meaning as industrial vocational school or industrial class used by (Yoto et al., 2019). This kind of school-industry partnership is currently starting to develop under the initiation of some industries. Furthermore, the teaching-industry term has not well known enough in vocational education literature compared to other terms. The term teaching-factory (Alptekin et al., 2001; Chryssolouris et al., 2016; Martawijaya, 2012) is commonly used compared to teaching-industry. Teaching-factory is defined as a learning concept that adopts applied-oriented training practices and approaches that combine learning and working environments from which tangible and relevant learning experiences are obtained (Nanyang Polytechnic, 2021). Abele et al. (2015) and Lamancusa et al. (2008) use the term learning factory to express a learning system that includes the meaning of learning and production simultaneously. Therefore, basically, these terms indicate a similar meaning. The difference is, in the teaching industry, there is a part of learning that is carried out in partner industries, while the teaching-factory concept does not yet contain that meaning.

Explanation of article 15 of Law Number 20 of 2003 concerning the National Education System states that vocational secondary education aims to prepare students, especially to work in specific fields. It was also stated that the form of vocational education at the secondary education level is the Vocational High School (VHS). According to the Indonesian Qualifications Framework (IQF), VHS graduates are at level 2 with a description of specialized competencies consist of: 1.) Being able to carry out a specific task by using tools, information, and work procedures that are commonly used, as well as showing performance with measurable quality under direct supervision; (2) Possess basic operational knowledge and factual knowledge of specific work areas so that they are able to choose available solutions of problems that commonly arise; and (3) Take responsibility for their own work and can be given the responsibility to guide others (President of the Republic of Indonesia, 2003).

The description of Level 2 IQF competencies is very much in accordance with vocational education's objectives, as stated in the National Education System Law, which prepares students to work in specific fields. The Level 2 IQF competency description can only be formed from the learning process that emphasizes real work experience. It should bring students to work, doing the actual work, repeatedly, so that they internalize the skills needed to complete every task in their job. Students' skills then should be evaluated using hands-on or applied performance, that is, based on the student's ability to complete the work (Finch & Crunkilton, 1999). However, it turns out there are still many graduates who do not get jobs in accordance with their education. High unemployment is the concern of every government because it threatens the economic welfare of its people.

One of the causes of unemployment is the mismatch between supply and labor demand. It might refer to the mismatch of types of competencies, level of education, and the number of workers produced by the educational institutions compared to the industrial needs. Slamet (2014) states that vocational education is economic education. Each program must answer the following three questions appropriately: what to produce, how to produce, and whom. Vocational development planning must be based on a workforce planning approach, not a social demand planning approach, so that graduates are aligned with the needs of the workforce.

To minimize the school-industry mismatch, the Indonesian Minister of Education for the 1989-1998 period, Prof. Dr. Ing. Wardiman, has launched a link-and-match program between the world of education and the industrial world. Link-and-match is a vocational education paradigm that leads to realizing the relationship and compatibility between educational institutions and the world of work (Djojonegoro et al., 1998). Thus, it is expected that vocational education orientation will no longer be supply-minded but will become more demand-minded (based on market needs). The flagship program to realize the link-and-match paradigm is the dual-system education model, which is then officiated with (Minister of Education and Culture Decree Number 323/U/1997 concerning the Implementation of Dual System Education in vocational high schools.

The minister's decree becomes the legal umbrella for implementing education partnerships between VHS and industry, which refers to the school-industry partnership. Some basic principles of implementing a dual system include: 1.) Each vocational school is required to have a partner industry; (2) Vocational schools apply curricula that are synchronized with partner industries; 3.) Sending students to work for three months to one year in industry, industry sub-divisions, and positions must be relevant to the student's primary competence; and 4.) The evaluation must involve experts from the industry or any professional certification body (Ministry of Education and Culture of the Republic of Indonesia, 1997).

One form of learning concept that brings educational institutions closer to the industrial world is the concept of the teaching industry. The teaching-industry learning model is a solid partnership education product between a vocational school and a partner industry. In this case, the industry entered and colored the learning process in VHS. Aspects that are influenced by the industry include curriculum content, learning, and equipment that have been pegged in reference to certain products or industries. The Ministry of Education and Culture calls the teaching industry as a learning model whose patterns can be described in stages: 1.) Vocational schools work together with industry in the provision of production sites; 2.) The industry transfers knowledge to the vocational school; and 3.) The vocational schools have limited licenses to market the collaborated products (Directorate of Vocational Development of the Republic of Indonesia, 2015). Sakarinto states that the basic concept of the teaching industry is the transfer of a portion of the educational process and the industrial process in a learning design so that the competency-based education occurs (Tugu Jojga, 2018).

From the description above, it can be explained that the concept of teaching-industry in VHS consists of: (1) vocational schools that open themselves to make changes to their learning systems to suit industry needs; (2) partner industries that have the awareness to collaborate with vocational schools to produce the desired workforce qualifications; (3) there is knowledge transfer from partner industries to vocational schools; (4) the unity of educational processes and industrial processes in one learning design; (5) the existence of ongoing cooperation between VHS and industry during the education process takes place. Thus, it is expected that the ongoing education program is a program that is indeed needed by the industry so that the possibility of a miss-match between educational institutions and the world of work can be avoided.

One form of teaching industry currently developing in Indonesia is the emergence of Honda Vocational Schools in producing prospective graduates of Honda motorcycle technicians. Honda, in this case, Astra Honda Motor, cooperates with Vocational High School (VHS) to carry out an education program which developed to produce technicians in the Honda motorcycle maintenance service network (AHASS) in Indonesia. The Honda motorcycle maintenance business market continues to grow over time because millions of Honda motorcycles are always absorbed by the national market each year. Honda also appears to be the leader of the national motorcycle market, so that the official maintenance workshop network must continue to be developed to provide after-sales services for Honda motorcycle owners. The increasing number of Honda workshops requires the availability of technicians who have the competency according to the needs of Honda workshops. It is Honda's concern to prepare a large number of Honda technicians.

This research aims to describe the pattern of cooperation between Honda and vocational school partners in carrying out an education program to prepare Honda motorcycle technicians. This research will reveal the fulfillment of demand-driven and link-and-match paradigms in the education program in terms of cooperation patterns, curriculum, and teaching model. The findings in this study

could be an alternative model for developing industrial-class vocational schools for other kinds of occupations.

RESEARCH METHOD

This research uses the case study qualitative research method. The institutions involved were Astra Motor Training Center (AMTC), located in Semarang as a training unit of Honda Motor, VHS Muhammadiyah 1 Surakarta as a vocational school, and Astra Honda Authorized Service Station (AHASS) workshop as the graduate user. AHASS is a network of Honda motorcycle maintenance workshops in Indonesia. Data collection was carried out using in-depth interviews, field observations, and documentation. The informants in this study were instructors of AMTC Semarang, who also act as program administrators respectively, teachers and head department of the Honda Technician Program at VHS Muhammadiyah 1 Surakarta, and the technician's head of the AHASS workshop.

The interview protocol was used as a guide to dig up information and keep the discussion during the interview focused on the research problems. An audio recorder device was used to record the conversation. A phone camera was used to take pictures of important facts during observation. Data validity is conducted using triangulation techniques, both methods, and data sources triangulation. Data validity is also sought by member checking and also by extending the data collection period. The research-finding was reported using explanation-building techniques with chronological reporting methods. That is, in this report, the researcher tries to explain the concept building of the phenomenon and report it coherently following the results of data analysis.

RESULT AND DISCUSSION

The Teaching-Industry Program Partnership Pattern

Based on data obtained from informants from AMTC and Muhammadiyah 1 VHS, cooperation between Honda as prospective users of VHS Motorcycle Engineering graduates and VHS as providers of motorcycle technician patterns can be formulated. The scheme of the Honda-VHS partnership pattern can be illustrated in Figure 1. The cooperation scheme between Honda and the VHS partner in Figure 1 explains that VHS provides labor graduates required by Astra Honda Motor (AHM). AHM is an industry that has a core business in manufacturing, distributing, and maintaining Honda motorcycles in Indonesia. In this case, AHM is the party that requires skilled motorcycle technicians for after-sale motorcycle maintenance services.

AHM entered into the learning process at VHS partners on the motorcycle technician expertise package. It influenced the learning process, following the expertise and technology that Honda needed in the Honda motorcycle maintenance network (AHASS). AHM, in this case, AMTC, provides training to teachers on the specific competencies desired by Honda. AHM also provides teaching media support, repair manuals, learning modules, and also special tools to VHS partners. Vocational schools send teachers for training in Honda motorcycle maintenance techniques to AMTC. Training for partner VHS teachers is always given regularly, especially every time Honda launches new products on the market.

The output of this collaboration program is graduates with highly skilled Honda motorcycle technicians. Graduates are ready to be employed in the AHASS network that spreads throughout Indonesia. The study also revealed that there are still many graduates who are not absorbed in the AHASS network. According to an informant from AMTC, not all graduates of this program can be absorbed by the AHASS network. For graduates of this kind, they are expected to be entrepreneurs in motorcycle maintenance because, basically, graduates of this program already have competence in motorcycle maintenance for all types and brands of motorcycles. The blue dashed line indicates the indirect benefits for Honda's business. High-skill non-official workshops will handle customers who do not deliver their motorcycle maintenance on the AHASS network.

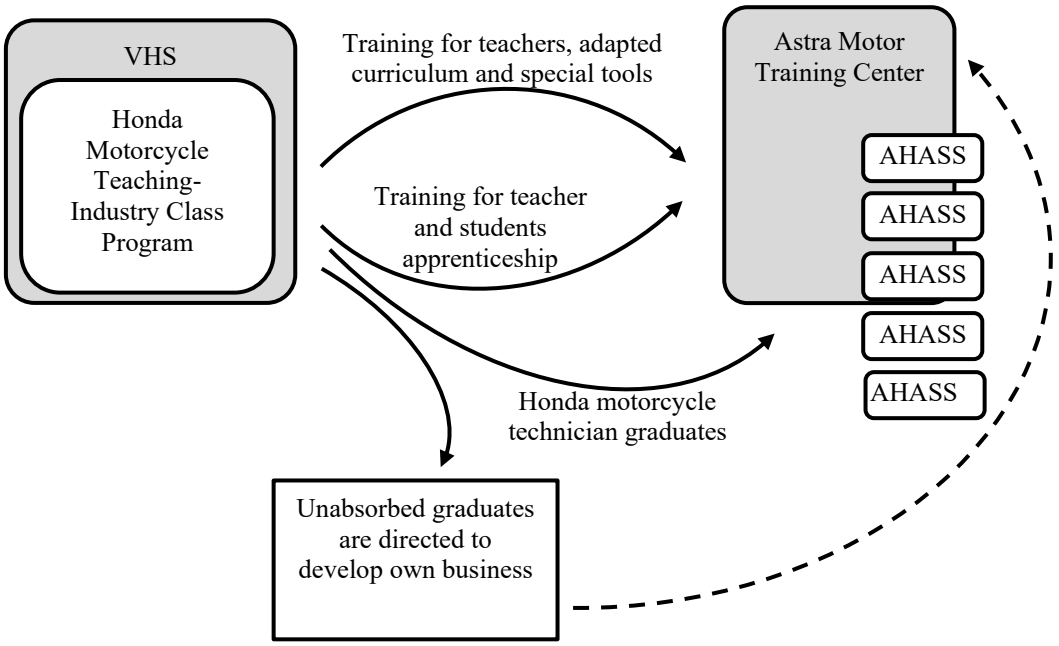

Figure 1. Honda Motor – VHS Cooperation Pattern

In this partnership model, there is a good relationship between Honda requiring graduates and VHS as labor-producing educational institutions. This is in accordance with Kloster's recommendation, which emphasizes the need for social partnerships in the development of vocational education (Klosters, 2014). The link-and-match paradigm is realized by accommodating the competencies along with the special technology desired by Honda in the curriculum of the Honda motorcycle technician education program at the VHS. Thus, the graduates produced by this cooperation program can certainly be employed with the qualifications that Honda indeed needs.

From this partnership program, the benefits gained by VHS include large opportunities for graduates to be recruited in the AHASS workshop network, apprenticeship opportunities for students, and graduates who have high competence in maintaining Honda motorcycle products so that they are capable of doing business in motorcycle maintenance services. The advantage for AHM is the strong core business, which is high motorcycle sales, due to the availability of skilled technicians for the maintenance of its products in the community, either through AHASS authorized workshops or by independent workshops.

In this program, the demand-driven paradigm works well because the program arises based on the needs of workers with special qualifications desired by the industry. This kind of school and industry partnership is highly recommended for increasing competence and conforming to industry needs (Mbah et al., 2018; Watters et al., 2016). However, because Honda absorbs not all graduates, it can be concluded that the realization of the link-and-match in this program is still partial, especially in the aspect of quality. While in the aspect of quantity, namely the number of labor needs, has not been fully realized.

The Teaching-Industry Program Curriculum

The integration of Honda's content into the partner VHS curriculum, which was initially referred to as the national curriculum, can be described schematically as Figure 2. In the illustration, the blue circles (i.e., A, B, and C (C1, C2, C3)) represent the national curriculum content referred by the VHS in case it does not cooperate with Honda. The orange circle is Honda's specialty. Most of the curriculum required by Honda has been included in group C subjects in the national curriculum (intersection between the big blue circle and the orange circle). However, there is an orange circle area that is not covered in the blue circle. This area represents the contents of Honda's curriculum, which has not been covered in group C subjects in the national curriculum for motorcycle technicians. This area illustrates Honda's special technological content, such as PGMFI, Combi Brake System,

Idling Stop System, etc. The combination of the standard curriculum for motorcycle technicians according to the national curriculum and the Honda content curriculum becomes the curriculum content of the Honda Vocational School curriculum.

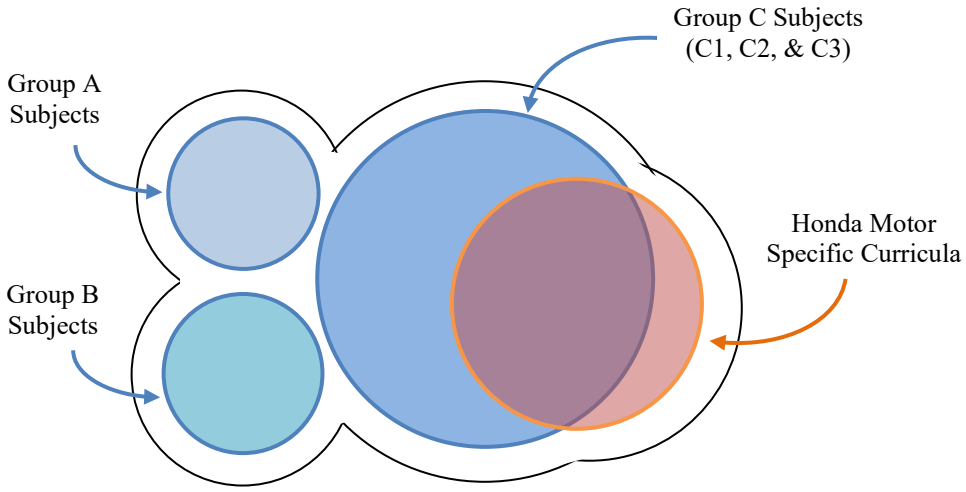

Figure 2. The Curriculum Structure of Honda Motor Technician VHS Program

The curriculum of the Honda - VHS motorcycle technician education program is a national curriculum of motorcycle maintenance technician expertise. However, the curriculum was modified to include special technologies and competencies needed to handle Honda motorcycle maintenance. Finch and Crunkilton (1999) states that the curriculum of vocational education institutions must be aligned closely with employers' needs, and schools must provide workplace-relevant learning for students. Thus, it can be said that the collaborative curriculum model between Honda and VHS is a good curriculum development model for vocational education institutions. Sohimi et al. (2019) recommends that education providers must be open and create a platform to accept industry opinions. Both parties have to share their resources, including skills, knowledge, facilities, and funding.

As a part of the national education program, VHS that implements this partnership program is seen using the national curriculum as a reference. However, it also accommodated Honda's special needs. Thus, the graduates of this program are graduates who have competence as standard motorcycle technician graduates, but they have more capability to maintain Honda motorcycles. Indonesian government gives flexibility for schools to develop their specific institutional unit level curriculum. Billet (2011) calls this curriculum a bottom-up curriculum, a curriculum that an educational institution initiated.

The Teaching and Learning Process

Learning is developed to resemble the conditions of the work environment. The similarity can be seen from various aspects found in vocational learning workshops as places for learning, AHASS workshops as workplaces where graduates will work, and workshops at AMTC. Various aspects of the synchronized learning environment include: 1.) The type of vehicle used as a teaching aid; 2.) Type of equipment used for work; 3.) Equipment layout and zoning work; 4.) Workshop color combinations; 5.) Design, type and color of clothing used for work; and 6.) Type of work handled.

The practical training program for students participating in the Honda motorcycle technician education program is carried out on the AHASS network. In the period of the practical training program, students participate in jobs handling customer motorcycle maintenance. This is to provide more hands-on experience about the world of work after students graduate. During the practical training program, students are supervised by experienced technicians in the AHASS workshop network. In the third year, the competency test was carried out by involving experienced Honda

technicians from AHASS. Honda instructors came to the vocational school to carry out the performance test following Honda standards.

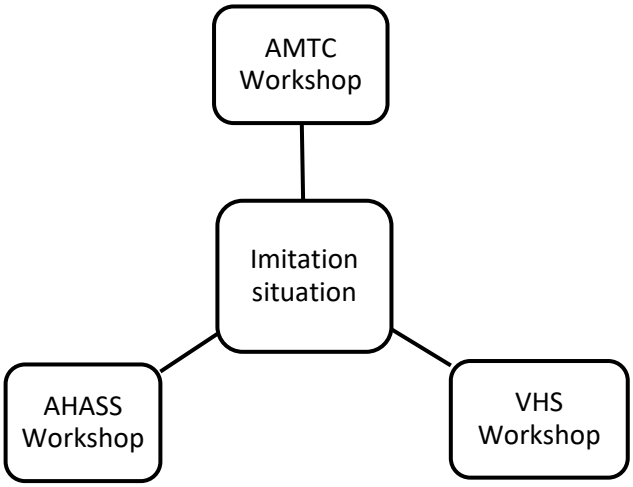

Figure 3. Similarities between VHS Workshop and the AHASS Workshop

The practical training program for students participating in the Honda motorcycle technician education program is carried out on the AHASS network. In the period of the practical training program, students participate in jobs handling customer motorcycle maintenance. This is to provide more hands-on experience about the world of work after students graduate. During the practical training program, students are supervised by experienced technicians in the AHASS workshop network. In the third year, the competency test was carried out by involving experienced Honda technicians from AHASS. Honda instructors came to the vocational school to carry out the performance test following Honda standards.

The learning process in this partnership program was developed to resemble the conditions of the work environment, both the conditions of the workshop, the atmosphere, the layout, and the equipment. Karre et al. (2019) states that the dramatic change of the industrial world requires graduate agility that can be minimized through a close-to-reality learning factory environment. The teaching method that has been carried out in this partnership program is also appropriate with the Prosser and Allen (1950) theorem that vocational education will be efficient if the environment in which students are trained is a replica of the environment in which students will work after graduation. The theorem also mentions that effective vocational education can only be given where training tasks are carried out in the same manner, tools, and machinery as used in the workplace. This can be seen in the similarity of work procedures, tools, and visual aids between Honda and VHS partners. By using the same facilities, students are accustomed to thinking and working as needed in the real world of work.

Confronting the students directly to any task from the workplace enables the formation of students' working and thinking habits as needed in later work. Thus, students truly gain meaningful learning experiences. Teaching is carried out by persons who are trained directly by trainers from the workplace where prospective graduates will work. It fits with Prosser's theorem that vocational education will be effective if the teacher has had successful experiences in applying skills and knowledge in the operations and working processes that they will train. This is also in line with other points of the Prosser theorem that a reliable source for the content knowledge of training at a particular occupation is from the experience of the occupational experts. Apprenticeship students at AHASS workshops will also significantly provide meaningful experiences for students. Eichhorst et al. (2013) states that apprenticeship programs combined with institutional learning are more effective than purely school-based vocational education.

CONCLUSION

The collaboration program between VHS and Honda Motor is a good practice of vocational education based on the demand-driven paradigm, especially at the secondary education level. Link-and-match is well realized in terms of preparing the competencies of graduates according to the company's need, but the number of workforce needs and the number of graduates produced by partner schools has not been matching. Graduates who are not absorbed in the company's business network still have the opportunity to work or set up independent businesses in the same business field, namely in the field of motorcycle maintenance outside the company's official network. A close relationship must be established between the school and the industry to carry out this partnership program. One party is the other party's partner and vice versa. Both parties must agree to share knowledge, skills, equipment, and funding between them. Schools must be open and accommodate industrial needs to be integrated into the learning system in schools.

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The mindfulness aspects in the teaching of culinary art in vocational high school

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ABSTRACT

This study aims to describe the aspects of mindfulness in the teaching of culinary art in vocational high schools. The aspects of mindfulness in the field of teaching consist of novelty, variety, joyfulness, meaningfulness, and alertness in learning. The benefits of mindfulness are related to the competencies in creativity, communication, collaboration, and critical thinking. These competencies are often referred to as the "Four C's" and are considered important competencies in the 21st century. The research variables based on theoretical studies in the fields of education and psychology consist of novelty, variety, joyfulness, meaningfulness, and alertness in learning. The population in this study is productive teachers of the department of culinary art at five vocational high schools in the Special Region of Yogyakarta. The specified sample is 30 teachers. The data were collected using a questionnaire. The validity was measured through product-moment testing, and the reliability was measured using the Cronbach alpha model with the SPSS 16.00 program. The data analysis was done using descriptive analysis. The data were analyzed by calculating the ideal score, mean, and standard deviation and by categorizing the data. The results show that the mindfulness aspect of culinary teaching consists of 1.) Novelty, which is in the good category, with a percentage of 53.33%; 2.) Variation, which is in the good category, with a percentage of 66.67%; 3.) Excitement, which is in the very good category, with a percentage of 60%; 4.) Meaningfulness, which is in the very good category, with a percentage of 76.67%; and 5.) Alertness, which is in the very good category, with a percentage of 70%.

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INTRODUCTION

In the Industrial Revolution 4, technological advances have changed many things in life, including work competence (Schwab, 2015). The National Employer Skills Survey shows that there are 16% of job vacancies that are difficult to fill by job seekers because they do not have the right skills for these vacancies. The UKCES survey results show that about 50% of the workers have the perception that the education system does not teach students sufficient job skills (UK Commission for Employment and Skills, 2010). The data obtained from the Central Bureau of Statistics show that Vocational High School (VHS) graduates are the largest contributors to unemployment data in the Special Region of Yogyakarta (Evani, 2019).

According to the General Manager of Astra Honda Motor, Ahmad Muhibuddin, there is a gap between the capabilities of VHS graduates and the capabilities needed by industry, especially in

the field of new technology. Bukalapak CEO, Achmad Zaki, stated that the competencies of vocational high school graduates were not in accordance with the competencies needed by the industry (Taufik & Mulyani, 2018). This problem should be a serious consideration for vocational high school stakeholders and related parties. Other research shows that there are some competencies that are considered quite important in the 21st century, referred to as the "Four C's". These abilities are in the form of creativity, collaboration, communication, and critical thinking (Davenport & Pagnini, 2016). An IBM poll involving 1,500 CEOs shows that creativity can shape future leadership skills (Dyer et al., 2011). Vocational high schools should provide their graduates with this ability in order to make it easier for them to work in the industrial sector.

The aspects of mindfulness can be seen as an alternative approach to developing important skills in the 21st century. Creswell (2017) conducted research on mindfulness interventions. The results of his research show that there is an increase in problem-solving performance, feelings of affection, and close relationships with others. In the research, the Kudesia (2015) hypothesis showed a relationship between mindfulness and creativity in its empirical study, and its findings indicate the development in the 'unseen' problem solving. For direct research on the aspects of mindfulness in education, see the Langerian School Report. This report shows that mindfulness can enhance students' "Four C's" competencies and can be a powerful tool or method for undergraduate and secondary schools (Davenport & Pagnini, 2016). These findings indicate that mindfulness can develop the competencies related to employability, and it is in accordance with the needs of vocational high schools.

Maynard et al. (2017) reports that the number of students who experience emotional disturbances in developing competence to learn at school begins to increase. This issue makes policymakers seek solutions to the social and emotional functioning of students. From these studies, mindfulness has been proven to be effective on health, social, and psychological aspects (Maynard et al., 2017). Another experiment tried to apply mindfulness meditation to teachers. The experiment used an intervention method for teachers and showed that teachers tended to have control over themselves without the need for outside help, which is beneficial to their psychological well-being (Maharani, 2016). Another study found that mindfulness had a significant impact on self-acceptance in young people whose parents were divorced. Surprisingly, the results show that mindfulness significantly affects their self-acceptance as young people whose parents are divorced (Fauzia & Listiyandini, 2018).

Technological advances in the Industrial Revolution 4.0 era have made humans connect quickly to many people. The previous discussion shows that communication and collaboration are important skills in the 21st century. This aligns with the basis of the mindfulness theory developed by several experts who emphasize the close relationship with everyone. The developed Rechtschaffen theory comes from Kabar-Zinn's (2001) theory, where mindfulness in the education system must emphasize the student's affection for others, both for other students and for the teacher. The practice of loving-kindness meditation on students is a good treatment for the educational process (Rechtschaffen, 2014). At the Langerian School, the socio-emotional function of both students and teachers increases regardless of social and economic status (Davenport & Pagnini, 2016). In Langer's (2016) study, students were encouraged to think about possible plans to play together when a new student was in their class. They were encouraged to think about the strengths and weaknesses of the new student so that they could play together (Langer, 2016). Creswell's (2017) research also shows that the compassionate element (loving-kindness meditation) in mindfulness meditation can increase feelings of closeness to others.

Formally and institutionally, the mindfulness approach has not been applied to education in Indonesia, especially in vocational education. Recent research shows that the application of mindfulness to education in Asia is only 5%, in North America 74%, Europe 16%, Canada 5% (Khng, 2018). This makes it difficult for researchers to conduct experimental research or classroom action research because vocational education has not yet applied the mindfulness approach to the teaching process. Therefore, this research is intended as a preliminary study on the aspects that exist in teaching and relating to mindfulness in learning in vocational high schools.

This study aims to describe the mindfulness aspect of teaching culinary arts in vocational high schools. Mindfulness in learning consists of novelty, variety, joyfulness, meaningfulness, and

alertness in learning. These aspects or variables come from the theory of sideways learning (Langer, 2016), the seven qualities of mindfulness (Kabat-Zinn, 2013), and the theory of meaningful learning from Ausubel (Sutarto, 2017).

There are various definitions of mindfulness given by experts. Among others is mindfulness as a condition or state (mental or mind), mindfulness as a process, and mindfulness as a practice. In Langer's definition, mindfulness emphasizes the state of awareness that is aware of the context and content of information (Deringer, 2016). Another definition of mindfulness emphasizes a non-judgmental, continuous, and alert to the present life (Lebuda et al., 2016). The definition of mindfulness as a practice comes from Kabat-Zinn (2013), who states mindfulness as an ancient Buddhist practice of mindfulness that emphasizes living the spirit of life within us and the universe. Kabat-Zinn (2013) emphasizes self-introspection and the ability to appreciate the situatio. The definition of mindfulness as a process emphasizes the process of being openly aware of life experiences. Creswell (2017) says that we often let our minds wander, react automatically (lack of awareness), and be in situations we do not want but try to suppress them. For a deeper understanding of the qualities or principles of mindfulness, the discussion is reviewed by several experts. In Kabat-Zinn's (2013) study, seven attitudes need to be instilled to develop a mindful state. In simple terms, these attitudes need to be applied every day and can be beneficial to mental conditions. Mindfulness's seven attitudes/qualities are non-judgment, patience, beginner thinking, acceptance, moderation, confidence, and resignation.

> *A non-judgmental attitude is a mental state that frees our minds from judgmental behavior. Human instincts will determine something that has the potential to be a "threat" or "value," but humans are often automatically driven by the thoughts to judge everything. In mindfulness practice, we always cultivate an attitude of not judging everything, including judging others. Patience is an attitude that we must cultivate within ourselves. Mindfulness practice must always place an attitude to patience in everything because sometimes our mind wanders and is turbulent. Accepting our wandering thoughts while controlling ourselves not to worry or rush is a good idea. The beginner's mind is an attitude that always reminds our mind that every day is a new experience to learn. Sometimes in mindfulness practice, we have expectations from the experiences we have had. The beginner's mind cultivates attitudes to see things like the first time. Acceptance is an attitude with which we accept the condition when we are sick and bored and when many things are going on in our mind and body. This concept has revolved around the circle of psychology. Non-striving is an attitude with which we do not push ourselves too big. Many people have goals, including people who learn mindfulness meditation. But those goals can lead them to a stress clinic. In other words, they do not have any expectations. (6) Confidence is an attitude of believing in yourself. This attitude is related to acceptance. It is believing in ourselves and believing in the journey of our lives. Resignation is a mental attitude in which we let go of our feelings, memories, and experiences. Sometimes some memories have strong feelings. Mindfulness trains us to let go of our feelings, memories, and experiences (Kabat-Zinn, 2013).*

In his article, Langer (2000) states that several things can make teaching mindful or mindless. To confirm this statement and as a preliminary study, the researcher conducted interviews with teachers and made observations in the culinary expertise program at State Vocational High School 6 Yogyakarta. From the interviews and observations, it can be seen that teachers begin to have a mindset not to judge or label their students. Teachers are more likely to use the methods of hands-on research and discovery learning in their teaching. They support students to be alert, especially during practical learning. They are more likely to use discussion in teaching and support students to make their own hypotheses. They have a mindset that learning should be fun and even students should not be depressed in learning. They always appreciate every teaching process. They support and motivate students to learn from their mistakes. This mindset and attitude can support students to be more mindful.

Several mindsets can lead students into a mindless state like the following. Teachers still think that remembering is very important in education, especially when remembering recipes, and students are required to follow standard operating procedures from recipes. In Langer's (2000) study,

the mindset of remembering (remembering recipes) and following standard steps (standard operating procedures) can lead students into a mindless state. Even so, it is still a debate among experts about students being required to remember and follow standard operating procedures. For this, the researcher did not conclude and left for further research.

In this discussion, several theories related to mindfulness in education are examined. In Langer's theory, mindfulness is a flexible state of mind, which actively engages in the present moment, pays attention to new things, and is sensitive to different contexts (Langer, 2000). While in the study of his new theory, Langer formed a learning concept called sideways learning. Sideways learning is in the form of: 1.) Openness to novelty; 2.) Awareness of differences; 3.) Sensitivity to different contexts; 4.) Awareness of different perspectives; and 5.) Orientation to the present moment (Langer, 2016).

The first variable of this research is a novelty in learning. This variable is examined from Langer's (2016) theory of openness to novelty and Kabat-Zinn's (2013) theory of the beginner's mind, where every day is a new experience to learn. Novelty in teaching is in the form of measuring the level of teacher intensity in terms of encouraging aspects of novelty in teaching carried out on teaching materials, teaching methods, teaching media, and learning resources. Novelty in teaching materials is in the form of the materials on new technologies in culinary, new cuisines in culinary, new techniques in culinary, new types of work in culinary, and new industries/businesses in culinary. Novelty in teaching methods is about the teachers' use of new methods in teaching. Novelty in teaching media deals with the use of new teaching media (IT, visual media, audio media, etc). Novelty in new learning resources is in the form of the use of the Internet as learning resources and inviting experts to school as learning resources.

The second variable in this study is variation in teaching. This variable is examined from Langer's (2016) theory of awareness of differences, sensitivity to differences in context, and awareness of different perspectives. The basis of this variable comes from Langer's theory and colleagues' research. This study emphasizes the use of more varied instructions compared to fair instructions. For example, in a two-group piano lesson, the first group was asked to memorize and repeat the game, while the second group was asked to vary their piano playing. The provision of varied and conditional instructions also has an effect on learning.

Variation in teaching is in the form of measuring the level of teacher intensity in terms of encouraging aspects of variation in teaching carried out on teaching materials, teaching methods, teaching media, and sources of teaching materials. Variations in teaching materials can be in the form of teachers varying the perspective of the material based on the point of view of culinary workers, culinary business owners, consumers, the varying subject matter related to different types of cuisine, types of cooking utensils, cooking methods, and cooking ingredients. Variation in teaching methods is in the form of teachers often varying teaching methods, teaching media, sources of teaching materials, as well as varying the teaching objectives.

The third variable in this study is joyfulness in learning. This variable comes from Kabat-Zinn's (2013) theory which emphasizes the appreciation of the present moment, Langer's study of turning work into play, and loving-kindness meditation interventions in education (Rechtschaffen, 2014). In Langer's (2016) study, teachers can change the mindset that learning is fun. In addition, thoughts of love or closeness between fellow students and teachers can be developed by thinking about good things about friends and teachers. This has been tested in Langerian schools (Davenport & Pagnini, 2016). Joyfulness in learning is in the form of measuring the level of teacher intensity to encourage aspects of variety in teaching carried out in the teaching process and methods. The joyfulness in the teaching process can be in the form of a teacher's mindset of learning as a fun activity, and evaluative teacher's attitude, the teacher's attitude in building personal relationships with students (life, interests, and curiosity), and the attitude of teachers who are able to appreciate the abilities of their students. The joyfulness in learning methods can be in the form of teachers often using fun teaching methods and relating the material to students' things.

The fourth variable in this study is meaningfulness in learning. This variable is in the study of Langer's theory, where teaching must encourage students to make their own hypotheses so that they are more meaningful for students (Langer, 2016). It is drawn initially from Kabat-Zinn's (2013) theory of self-confidence. In addition, cognitive teaching theory also emphasizes that learning

must be meaningful for students, as stated in the meaningful learning theory from Ausubel and hands-on research & discovery learning from Bruner (Sutarto, 2017). Meaningful learning theory and discovery learning theory are also emphasized in Langer's (2016) theory of mindfulness learning. Meaningfulness in learning is in the form of measuring the level of teacher intensity to encourage the aspects of meaningfulness in learning carried out on teaching materials, teaching processes, and teaching methods. The meaningfulness of the learning material can be in the form of interpreting the material in the student's personality (life, curiosity, interest) and making the subject matter meaningful for students. Meaningfulness in the learning process can be in the form of teacher attitudes to encouraging students to make their own hypotheses and teacher attitudes to encourage students to learn from failure. Meaningfulness in learning methods can be in the form of teachers often using hands-on research and discovery teaching methods.

The fifth variable in this study is alertness in learning. This variable is derived from Kabat Zinn's theory of inculcating higher alertness, clarity, and self-acceptance (Kabat-Zinn, 2013). Meanwhile, Langer's (2016) developed the concept of soft vigilance, namely alertness that can still respond to the surrounding environment, as previously discussed regarding sideways learning. In the previous variables, the emphasis on novelty and variety in teaching is very important to increase openness to novelty, alertness to differences, sensitivity to context, awareness of different perspectives, and orientation to the current moment in teaching.

Alertness in learning is in the form of measuring the level of teacher intensity in terms of encouraging aspects of alertness in learning carried out on teaching materials, teaching processes, and learning resources. Alertness in learning materials can be in the form of teachers often encouraging students to pay attention and be aware of differences in materials and perspectives (differences in cuisine, cooking utensils, cooking ingredients, cooking work, cooking industry). Alertness to the teaching process can be in the form of teachers being alert to class attendance and teachers encouraging students to learn the theory and practice. Alertness to learning resources can be in the form of teachers encouraging students to pay attention to the differences in each learning resource. Aspects of mindfulness consisting of novelty, variety, joy, meaningfulness, and alertness that are useful for fostering creativity, communication, collaboration, and critical thinking in students can be seen in Figure 1.

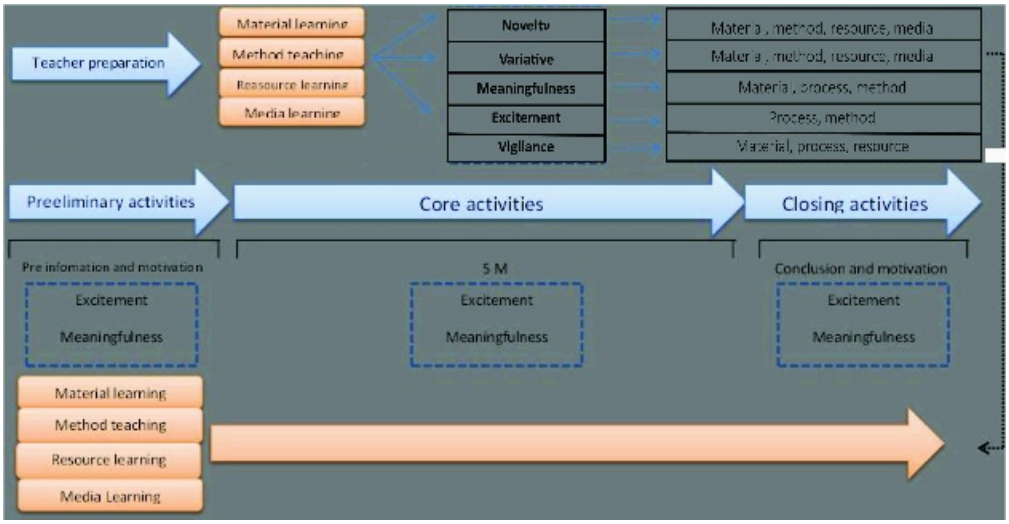

Figure 1. Aspects of Mindfulness

RESEARCH METHOD

This research is a quantitative descriptive study that describes the variables in the study. The data were processed using descriptive statistical analysis. The categorization of the data used the ideal score. The population in this study is productive Culinary art teachers of vocational high schools in the Special Region of Yogyakarta. The sample is 42 teachers of State Vocational High School

(SVHS) 6 Yogyakarta, SVHS 4 Yogyakarta, SVHS 2 Godean, and Private Vocational High School 2 Bopkri with the following details, which can be seen in Table 1.

Table 1. Research sample

No.	Productive Teachers of Culinary art	Total
1.	State Vocational High School 6. Yogyakarta	15
2.	State Vocational High School 4. Yogyakarta	15
3.	State Vocational High School 2. Godean	8
4.	Private Vocational High School 2 Bopkri	4
	Total	42

According to Sugiyono (2013), the sample is part of the number and characteristics possessed by the population. The number of samples is determined using the Slovin formula which can be seen in Formula 1.

$$s = \frac{N}{1 + N\,(e)^2} \quad (1)$$

s = Number of sample
N = Number of population
e = Standard error of measurement

From this study, it is known that the number of the population (N) is 42 with the standard error of measurement (e) of 10%, so the number of the sample obtained is as follows:

$$Number\ of\ sample = \frac{42}{1 + 42(0.1)^2}$$

$$Number\ of\ sample = \frac{42}{1.42}$$

$$Number\ of\ sample = 29.58 \approx 30$$

This study uses the non-probability sampling method because the data collection was carried out during the outbreak of the Covid-19 virus, so the government made a policy to close schools, including vocational high schools. Therefore, the researcher decided to use the non-probability sampling method by choosing the right respondents to avoid subjectivity in the study.

The data collected in this study used a questionnaire. According to Buchari, a questionnaire is a list of questions given to other people who are willing to respond (respondents) in accordance with user requests (Alma, 1993). The questionnaire is in the form of a closed questionnaire, where the respondent only needs to put a checkmark to answer each question. The following are the steps the researcher took to make the instrument: 1.) Determining the variables based on the theoretical study that has been discussed in the previous section. There are five variables to be studied in this study, namely novelty, variety, excitement, meaningfulness, and alertness in learning; 2.) Dividing the stages in teaching, such as in the frame of mind starting from preliminary activities, core activities, and closing activities; 3.) Dividing teaching components in the form of teaching materials, teaching media, learning resources, teaching methods, teaching processes, teaching outcomes; 4.) Construct an instrument grid based on the variables made and provide indicators for each sub variable according to the stages and components of teaching; and 5.) Making instruments based on the grid that has been made.

The validity test aims to test whether the questionnaire is feasible to be used as a research instrument. A measuring device is said to be valid if it can be used to measure what should be measured (Sugiyono, 2013). Validity shows the degree of accuracy between the data that are actually about an object and the data that the researcher can collect. The validity test used in this study is the product-moment correlation, resulting in four invalid or lower than reliable items, so four items are

omitted. A reliable instrument is an instrument that can be trusted to be used as a data collection tool; it is not tendentious, or it does not direct respondents to choose certain answers (Arikunto, 2013). The data that had been obtained were analyzed using Cronbach's Alpha formula with the help of the SPSS 16.0 program. The value obtained is 0.956, which is greater than 0.600, so that the instrument is declared reliable.

RESULT AND DISCUSSION

The results regarding the novelty variable come from Items 1-11 of the instrument. Each item consists of five answer choices: never, rarely, sometimes, often, and always with a score of 1 to 5, respectively. The result of empirical data from the questionnaire that has been filled in by 30 teachers of the department of culinary art is can be seen in Table 2.

Table 2. Empirical Data of Novelty in Teaching

Variable	Score
R1	43
R2	53
R3	53
R4	35
R5	45
R6	50
R7	45
R8	27
R9	38
R10	33
R11	35
R12	41
R13	43
R14	43
R15	49
R16	31
R17	31
R18	38
R19	36
R20	39
R21	42
R22	34
R23	38
R24	42
R25	35
R26	34
R27	41
R28	40
R29	41
R30	34

The data on novelty in learning culinary art was analyzed by calculating the range of ideal scores. The ideal score range was calculated from the number of questions multiplied by the maximum score. The novelty variable in teaching has 11 questions with a maximum score of five, so that the ideal score range is 55. Meanwhile, to get the ideal average, the ideal score range was divided by two, and the resulting number was 27.5. The standard deviation was obtained from the ideal mean divided by three. The result of the analysis is presented in Table 3.

Table 3. Analysis of Novelty in Teaching

Analysis	Score
Ideal Score Range	55
pi mean (MD)	27.5
Standard deviation	9.16667
Minimum value	11

To categorize the data, the researcher divided them into five classes, namely very good, good, fair, poor, and very poor. Class determination was established based on the ideal score range, ideal mean, standard deviation, and minimum score so that the data could be distributed properly. Furthermore, the frequency was calculated from the data that had been obtained, and the percentage was determined from that frequency. The result of the categorization of novelty in teaching is shown in Table 4.

Table 4. Categorization of Novelty in Teaching

Category	Score Range	Frequency	Percentage
Very good	$41.25 < x \leq 55$	11	36.67%
Good	$32.08333 < x \leq 41.25$	16	53.33%
Fair	$22.916667 < x \leq 32.08333$	3	10%
Poor	$13.75 < x \leq 22.916667$	0	0%
Very poor	$11 < x \leq 13.75$	0	0%

The result of the data analysis shows that novelty in teaching has the largest frequency in the good category, with a percentage of 53.33%. The second-largest frequency is in the very good category, with a percentage of 36.67, and the third largest frequency is in the normal category with a percentage of 10%. The other category has a frequency of 0. From the results of the analysis above, it can be stated that the novelty in teaching in the field of culinary art is in a good category.

Novelty in teaching is explained in mindfulness theory, openness to innovation or new science and technology (Langer, 2016), and thinking like a beginner (Kabat-Zinn, 2013). Novelty in teaching emphasizes the teacher's efforts to bring new experiences and/or information into the teaching process. Delivering novelty in teaching can be done through teaching materials, teaching methods, teaching media, and learning resources. Novelty in teaching in the field of culinary art can be linked to novelties in the culinary industry, including the latest technology, the latest cooking utensils, the latest cooking methods, new jobs in the culinary industry, and so on. Delivering novelty in teaching can create the mental condition of students to think like a beginner.

The result of the variable of variation in teaching is from Items 12-26 of the instrument. Each item consists of five answer choices: never, rarely, sometimes, often, and always with a score of 1 to 5, respectively. The results of empirical data from a questionnaire that has been filled out by 30 teachers majoring in culinary arts can be seen in Table 6.

The data on the variation in the teaching of culinary art was analyzed by calculating the range of ideal scores. The ideal score range was calculated from the number of questions multiplied by the maximum score. The variation variable in teaching had 15 items with a maximum score of five, so that the ideal score range was 75. Meanwhile, to get the ideal average was by dividing the ideal score range by two, resulting in 37.5. The standard deviation was obtained from the ideal mean divided by three. The result of the analysis is presented in Table 5.

Table 5. Analysis of Variation in Teaching

Analysis	Score
Ideal Score Range (SD)	75
Ideal mean(MD)	37.5
Standard deviation	12.5
Minimum score	15

Table 6. Empirical Data on Variation in Teaching

Variable	Score
R1	58
R2	67
R3	67
R4	52
R5	56
R6	61
R7	56
R8	50
R9	44
R10	51
R11	45
R12	46
R13	55
R14	55
R15	65
R16	52
R17	52
R18	58
R19	55
R20	51
R21	60
R22	48
R23	45
R24	56
R25	58
R26	54
R27	49
R28	59
R29	59
R30	48

To categorize the data, the researcher divided them into five classes, namely very good, good, fair, poor, and very poor. Class determination was established based on the ideal score range, ideal mean, standard deviation, and minimum score so that the data could be distributed properly. Furthermore, the frequency was calculated from the data that had been obtained, and the percentage was determined from the frequency. The result of the categorization of variation in teaching is presented in Table 7.

Table 7. Categorization of Variation in Teaching

Category	Score Range	Frequency	Percentage
Very good	$56.25 < x \leq 75$	10	33.33%
Good	$43.75 < x \leq 56.25$	20	66.67%
Fair	$31.25 < x \leq 43.75$	0	0%
Poor	$18.75 < x \leq 31.25$	0	0%
Very poor	$15 < x \leq 18.75$	0	0%

The result of the data analysis shows that the variation in teaching has the largest frequency in either category with a percentage of 66.67%. The second frequency is very good with a percentage of 33.33%. The other category has a frequency of 0. From the data analysis, it can be stated that the variation in teaching in the field of culinary art is in a good category.

Variation in teaching has been explained in the mindfulness theory, where it is emphasized to use things that are varied rather than standard (Langer, 2016). Variation in teaching emphasizes the teacher's efforts to bring varied experiences and/or information to students so that students become more alert and sensitive to different perspectives and contexts. Teachers can do variations in teaching through teaching materials, teaching methods, teaching media, and learning resources.

The result of the joyfulness variable in teaching is from Items 26-34 of the instrument. Each item consists of five answer choices: never, rarely, sometimes, often, and always with a score of 1 to 5, respectively. The result of empirical data from the questionnaire that has been filled out by 30 teachers of the department of culinary arts can be seen in Table 8.

Table 8. Empirical Data on Joyfulness in Learning

Variable	Score
R1	25
R2	29
R3	29
R4	26
R5	28
R6	29
R7	28
R8	28
R9	27
R10	26
R11	25
R12	21
R13	32
R14	32
R15	32
R16	26
R17	26
R18	28
R19	26
R20	27
R21	27
R22	22
R23	26
R24	32
R25	28
R26	27
R27	23
R28	28
R29	28
R30	22

The data on joyfulness in learning culinary art was analyzed by calculating the ideal score range. The ideal score range was calculated from the number of questions multiplied by the maximum score. The joyfulness variable in teaching had seven questions with a maximum score of five, so that the ideal score range is 35. Meanwhile, to get the ideal mean was by dividing the ideal score range by two, and the result was 17.5. The standard deviation was obtained from the ideal mean divided by three. The result of the analysis is presented in Table 9.

To categorize the data, the researcher divided them into five classes, namely very good, good, fair, poor, and very poor. Class determination was established based on the ideal score range, ideal mean, standard deviation, and minimum score so that the data could be distributed properly. Furthermore, the frequency was calculated from the data that had been obtained, and the percentage

was determined from the frequency. The result of the categorization of joyfulness in learning is presented in Table 10.

Table 9. Analysis of Joyfulness in Learning

Analysis	Score
Ideal Score Range (SD)	35
Ideal mean (MD)	17.5
Standard deviation	5.8333
Minimum score	7

Table 10. Categorization of Joyfulness in learning

Category	Score Range	Frequency	Percentage
Very good	$26.25 < x \leq 35$	18	60%
Good	$20.41667 < x \leq 26.25$	12	40%
Fair	$14.5833 < x \leq 20.41667$	0	0%
Poor	$8.75 < x \leq 14.5833$	0	0%
Very poor	$7 < x \leq 8.75$	0	0%

Table 11. Empirical Data of Meaningfulness in Learning

Variable	Score
R1	21
R2	23
R3	23
R4	19
R5	20
R6	19
R7	20
R8	20
R9	19
R10	21
R11	18
R12	15
R13	23
R14	23
R15	25
R16	20
R17	20
R18	20
R19	17
R20	21
R21	20
R22	16
R23	17
R24	23
R25	20
R26	20
R27	18
R28	20
R29	20
R30	16

The result of the data analysis shows that joyfulness in learning has the largest frequency in the very good category with a percentage of 60%. The second-largest frequency in the category is good with a percentage of 40%. The other category has a frequency of 0. From the analysis of the data above, it can be stated that the joyfulness in learning in the culinary field is in a very good category. The joyfulness of teaching is an important part of the mindfulness learning theory. In the field of education, some mindsets, such as delaying excitement to achieve a goal in teaching, can lead students to a mindless condition, more specifically, can make the mind wander. In the mindfulness theory, it is necessary to have a mindset that working/learning is fun (Langer, 2016), and/or can be done by having an attitude to appreciating every existing condition (Kabat-Zinn, 2013). Joyfulness in learning can be done through teaching methods, teaching processes, and teaching media. The teacher must know the student's personal condition (interests, curiosity, life) in this case.

The results of the analysis of meaningfulness in learning are from Items 35-39 of the instrument. Each item consists of five answer choices: never, rarely, sometimes, often, and always with a score of 1 to 5, respectively. The result of the analysis of the empirical data from the questionnaire that had been filled in by 30 teachers of the department of culinary art can be seen in Table 11.

The data on meaningfulness in learning culinary art was analyzed by calculating the ideal score range. The ideal score range was calculated from the number of questions multiplied by the maximum score. The meaningfulness variable in teaching had five questions with a maximum score of five, so that the ideal score range was 25. Meanwhile, to get the ideal mean was by dividing the ideal score range by two, and the result was 12.5. The standard deviation was obtained from the ideal mean divided by three. The result of the analysis is presented in Table 12.

Table 12. Analysis of Meaningfulness in Learning

Analysis	Score
Ideal Score Range (SD)	25
Ideal mean(MD)	12.5
Standard deviation	4.1667
Minimum score	5

To categorize the data, the researcher divided them into five classes, namely very good, good, fair, poor, and very poor. Class determination was established based on the ideal score range, ideal mean, standard deviation, and minimum score so that the data could be distributed properly. Furthermore, the frequency was calculated from the data that had been obtained, and the percentage was determined from the frequency. The result of the categorization of meaningfulness in learning is presented in Table 13.

Table 13. Categorization of Meaningfulness in Learning

Category	Score Range	Frequency	Percentage
Very good	$18.75 < x \leq 25$	23	76.67%
Good	$14.5833 < x \leq 18.75$	7	23.33%
Fair	$10.41667 < x \leq 14.5833$	0	0%
Poor	$6.25 < x \leq 10.41667$	0	0%
Very poor	$5 < x \leq 6.25$	0	0%

Based on Table 13, meaningfulness in learning has the largest frequency in the very good category with a percentage of 76.67%. The second-largest frequency is in a good category, with a percentage of 23.33%. The other category has a frequency of 0. From the data analysis, it can be stated that the meaningfulness in learning is very good.

The teacher can do meaningfulness in learning through teaching materials, teaching processes, and teaching methods. Preparation of teaching materials to be more meaningful for students can be done by linking teaching information with students' personal information. In Ausubel's meaningful learning theory, teaching materials must be assimilated into the student's personality without abridging (Sutarto, 2017), which is in accordance with the principles of the mindfulness learning theory. In addition, Langer (2016) added to use hands-on research and discovery teaching. Furthermore, inculcating an attitude of self-confidence is also one of the qualities of mindfulness (Kabat-Zinn, 2013).

The results of the analysis of alertness in learning are from Items 40-51 of the instrument. Each item consists of five answer choices: never, rarely, sometimes, often, and always with a score of 1 to 5, respectively. The result of empirical data from the questionnaire that has been filled in by 30 teachers of the department of culinary art can be seen in Table 14.

Table 14. Empirical Data on Mindfulness in Learning

Variable	Score
R1	47
R2	48
R3	48
R4	49
R5	48
R6	48
R7	48
R8	45
R9	46
R10	47
R11	46
R12	36
R13	51
R14	51
R15	60
R16	44
R17	44
R18	49
R19	41
R20	42
R21	48
R22	37
R23	36
R24	50
R25	47
R26	48
R27	47
R28	48
R29	48
R30	37

The data on alertness in the learning of culinary lessons were analyzed by calculating the ideal score range. The ideal score range was calculated from the number of questions multiplied by the maximum score. The variable of alertness in learning has 12 questions with a maximum score of five, so that the ideal score range is 60. Meanwhile, to get the ideal mean was by dividing the ideal score range by two, and the result was 30. The standard deviation was obtained from the results of the calculation of the ideal mean divided by three. The result of the analysis is presented in Table 15.

Table 15. Analysis of Alertness in Learning

Analysis	Score
Ideal Score Range (SD)	60
Ideal mean (MD)	30
Standard deviation	10
Minimum score	12

To categorize the data, the researcher divided them into five classes, namely very good, good, fair, poor, and very poor. Class determination was established based on the ideal score range, ideal mean, standard deviation, and minimum score so that the data could be distributed well. Furthermore, the frequency was calculated from the data that had been obtained, and the percentage was determined from the frequency. The result of categorizing mindfulness in learning is presented in Table 16.

Table 16. Categorization of Alertness in Learning

Category	Score Range	Frequency	Percentage
Very good	$45 < x \leq 60$	21	70%
Good	$35 < x \leq 45$	9	30%
Fair	$25 < x \leq 35$	0	0%
Poor	$15 < x \leq 25$	0	0%
Very poor	$45 < x \leq 60$	21	70%

Table 15 shows that alertness in learning has the largest frequency in the very good category with a percentage of 70%. The second-largest frequency is in a good category, with a percentage of 30%. Another category has a frequency of 0. Therefore, alertness in learning can be stated very well. Mindfulness is learning can be linked to being alert to the present moment and non-judgmental. In the mindfulness theory, attention to the present moment and a non-judgmental attitude can increase alertness (Kabat-Zinn, 2013). In the theory of sideways learning, alertness is related to being alert and sensitive to differences in context and perspectives (Langer, 2016). Teachers can do alertness in learning by encouraging students to pay attention to differences in teaching materials such as different perspectives of consumers, culinary industry workers, managers, and owners. The teacher must also be aware of the attention of the class and individual students. Teachers can also encourage students to be aware of both theoretical and practical learning.

Table 17. Categorization of Mindfulness Learning Aspects

Aspect	Very good	Good	Fair	Poor	Very poor
Novelty in learning	36.67%	53.33%	10%	0%	0%
Variation in learning	33.33%	66.67%	0%	0%	0%
Joyfulnessfulness in learning	60%	40%	0%	0%	0%
Meaningfulness in learning	76.67%	23.33%	0%	0%	0%
Alertness to learning	70%	30%	0%	0%	)0%

CONCLUSION

Based on the data that have been analyzed and discussed with 30 respondents of culinary art subject teachers, the following conclusions can be drawn: 1.) The aspect of novelty related to new dishes, new cooking utensils, and new businesses in the culinary field can be given by teachers through teaching preparation, materials, methods, learning resources, and teaching media. This aspect relates to openness to reforming and thinking attitude as a beginner, which is in accordance with the nature of attention in teaching culinary art in vocational high schools. It is in a good category, with a percentage of 53.33%; 2.) Teachers can make the aspects of variation on information in teaching through teaching preparation, materials, methods, learning resources, and teaching media.

This aspect relates to being alert and sensitive to contextual differences and perspectives that can increase creativity in teaching culinary art in vocational high school. It is in a good category, with a percentage of 66.67%; 3.) Teachers can apply the joyfulness aspect by knowing students' personalities through teaching methods and media. This aspect is able to change the mindset of work into a game and appreciate every moment of teaching in vocational high school. It is in a very good category, with a percentage of 60%; 4.) The teacher can carry out the aspect of meaningfulness through preliminary, core, and closing activities. This aspect relates to the student's personality, which can be applied through meaningful learning and discovery learning so as to increase the students' confidence in learning culinary art in vocational high school. It is in a very good category with a percentage of 76.67%; and 5.) The teacher carries the aspect of alertness in the preliminary, core, and closing activities. This aspect can encourage alertness and sensitivity to different perspectives according to sideways learning when teaching the theory and practice of culinary art in vocational high schools. It is in a very good category, with a percentage of 70%.

Based on the conclusions above, the implications are as follows: 1.) Teaching in the field of culinary expertise is more open to novelty. The students are encouraged to learn about new things in the culinary field; 2.) Teaching in the field of culinary expertise is more varied. The students are encouraged to learn many differences in the culinary field rather than learning about one thing; 3.) Learning in the field of gastronomy is more fun so that students do not feel burdened when learning gastronomy; 4.) Learning in the field of culinary expertise becomes more meaningful. The students are encouraged to link learning with their lives; and 5.) Learning in the field of culinary expertise is more alert. The students are always encouraged to be aware of differences in material as well as those in learning the theory and practice.

Based on the research, the following suggestions are made: 1.) Teachers can develop teaching activities starting from lesson planning, introduction, core, and closing activities by paying attention to the aspects of novelty, variety, joyfulness, meaningfulness, and alertness in learning; and 2.) The government, education offices, schools, and related stakeholders can assist teachers by creating training programs related to mindfulness learning.

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The influence of the principal instructional leadership on teacher's job satisfaction at vocational secondary schools

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ABSTRACT

This study aimed to discover the school principal instructional leadership influence on job satisfaction of vocational high school teachers in Sleman Regency, D.I. Yogyakarta. This type of research was ex-post facto with a quantitative approach. The questionnaire was conducted on 91 teachers (71,09% response rate) to examine the influence of principal instructional leadership (X) on teacher job satisfaction (Y). Validation of the instrument used expert judgment and empirical test with the Pearson Product Moment correlation, 43 out of 43 items are declared valid. The instrument reliability test was applied by using Cronbach's Alpha. The results of the reliability test showed that all variables were declared reliable (α > 0,7). A classical assumption test was done by testing normality, linearity, multicollinearity, and heteroscedasticity. Simple linear regression was used as data analysis to test the influence of the independent variable (X) towards the dependent variable (Y). The simple linear regression results indicate a positive and significant influence between the principal instructional leadership on teacher job satisfaction (t = 13,329, p = .000). The coefficient of determination value (R^2) of 0,666 indicates that the principal instructional leadership influences teacher job satisfaction by 66,6%. Meanwhile, the remaining 33,4% are influenced by other factors.

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INTRODUCTION

Teaching in the 21st century has many challenges for teachers that make teachers have more roles in school to meet the expectations of students, parents, and society of educational needs. This statement is equivalent to the argument of Türkoğlu et al. (2017) also stated that expectation had become lifelong education needs by involving every competency such as research, critical thinking, problem-solving, group work, and information and communi-cation technology use, resulting in the significant change towards teacher's responsibility. Buluc and Demir (2015) stated that teachers' competency in a particular field and teacher job satisfaction had become a necessity in working achievement and organizational productivity. Teacher job satisfaction is an essential predictor to determine the accomplishment of the learning process. Türkoğlu et al. (2017) stated that job satisfaction is crucial for the teaching profession since a teacher must serve the students through the teaching process. Locke (1969) stated that job satisfaction is a pleasant condition resulting from positive emotion in work evaluation or work experience from an individual.

Job satisfaction is considered as an emotional response to someone's job, physical condition, and social, while the job's satisfaction concept is how satisfied someone is with the expectations of

the job (Buluc & Demir, 2015). Nuraini et al. (2015) perceives teacher job satisfaction as an active emotional response from teachers related to the teachers' feelings experienced on various work aspects with the indicators as in their work as teachers, supportive working conditions, salary/reward, supervision from the leader, and supportive co-workers. The results from the pre-survey questionnaires trial of job satisfaction to 30 teachers sample on one of the vocational high schools in Tempel district in 2020 reveals that the teachers who give job satisfaction evaluation with a low category are six people (20%), teachers who give job satisfaction evaluation with a medium category are 13 people (43,33%), and teachers who give job satisfaction evaluation with a high category are 11 people (36,67%). The pre-survey data results reveal that most teacher job satisfaction evaluations percentage is in the medium category.

Based on the pre-survey results, it is found that the income of teachers, especially those who were not civil servants yet, can be said cannot fully meet the life needs. These results can be seen in the statement of teacher job satisfaction statement item on salary (item number 2) stated that economic needs are fulfilled from the salary of teaching works in school. Meanwhile, on average, teachers with non-civil servant status stated their assessments on a scale of (2) Moderately Agree and (1) Disagree. Salary is one of the determinants of teacher job satisfaction. Sufficient salaries allow teachers to feel satisfied with teaching work in school. This statement is proved by the study conducted by Rahayuningrum et al. (2019) that show salary has a positive influence on teacher job satisfaction at Vocational High School (VHS) PENDA 2 Karanganyar with the regression analysis results, with the r count value 0,545 > r table 0,301 which means salary has a significant influence on teacher job satisfaction. It means that an adequate salary will provide high job satisfaction to the teacher. Still, on the contrary, if the salary is not sufficient, then job satisfaction will also not be fulfilled. The results of other studies also show the same outcome, as stated by Hulmawiyah et al. (2018), where teacher compensation has a positive influence on job satisfaction of Vocational High School (VHS) 10 Malang teachers, both partially and simulta-neously (together with the principal leadership variable, and teacher work discipline).

The teacher's responsibility to fulfill learning administration also appears as a problem and causes the teacher's time management in preparing the learning material itself to be divided. Based on interviews with the deputy principal at one of the Vocational High Schools (VHS) in Tempel District, it was found that administrative activities outside of learning activities also took quite a lot of time for teachers. Hence, the teacher's time in implementing learning activities becomes less effective. It can be observed from the statement in the pre-survey results that have been conducted, "Teachers feel that working hours at school are effective." Some teachers stated that the assessment on a scale of (2) moderately agree and (3) agree. Time is one factor that determines effective learning; as Setyosari (2014) stated, good time management will produce an effective learning process.

The findings of the pre-survey in the field also show that the improvement of learning activities through various methods has not been tried or applied by all teachers. Some of the existing teachers are active in finding new methods and developments in teaching. However, there are still teachers who are less active in exploring methods in teaching. The teachers' effort in applying learning activities optimally is an aspect that can show the level of teacher job satisfaction for their work. This statement is in accordance with Cansoy et al. (2018) argument that teachers' belief in professional competence (in teaching) is essential in determining job satisfaction.

Skaalvik (2020) revealed that the school principal has a dominant role in developing a learning environment in school areas that affect teacher job satisfaction and student learning activity. The analysis of the effect of principal instructional leadership on teacher's perceptions conducted by Özdemir et al. (2020) revealed that there was a significant intermediate level relationship between the instructional behavior performed by the principal, and it is contributed positively to teacher's motivation and assignments, development of the students' ability to learn, and teacher self-evaluation skills about themselves and students.

Özdemir et al. (2020) argued that principal instructional leadership has consistently been proved to be an essential determinant of teacher self-efficacy perceptions. According to them, the instructional leadership that focuses on improving teaching and learning activities in schools is more effective on teacher self-efficacy than other leadership styles. Moreover, instructional leadership behaviors are essential in supporting students' academic success and making school staff adopt

student-centered learning. Other research findings of Özdemir et al. (2020) claimed that instructional leadership behavior makes a positive contribution not only to teachers' behavior on curriculum implementation, diversification, and evaluation of teaching methods but also their morals, expectations, and task-oriented work. Özdemir et al. (2020) research added concrete evidence that instructional leadership can positively contribute to teacher self-efficacy and the curriculum, morals, and teacher integrity.

Table 1. The Framework of Instructional Leadership Work

Dimension	Sub-dimension
Defining the school mission	• Framing school goals • Communicating school goals
Instructional program management	• Coordinating the curriculum • Supervising and evaluating the instruction • Monitoring the students' development • Providing learning activity time
Developing school learning climate	• Providing incentives for teacher • Providing incentives for the learning activity • Promoting professional development • Maintaining high visibility

Hallinger and Wang (2015) explained that the instructional leadership management framework becomes valuable lens researchers use to conceptualize how instructional leadership is implemented in schools. Hallinger and Wang (2015) revealed that instructional leadership has a conceptual framework consisting of three dimensions: defining the school's mission, managing instructional programs, and developing a positive school learning climate. These dimensions are illustrated into ten sub-functions of instructional leadership, as displayed in Table 1.

The findings from the research on instructional leadership conducted by Hallinger and Wang (2015) showed effects on the following aspects: 1.) Effects of personal antecedents (such as gender, training, experience) and school context (school level, school size, school SES) on instructional leadership; 2.) Effects of instructional leadership on organizations (school goals and vision, expectations, curriculum, teaching, teacher involvement); and 3.) The indirect and direct influence of instructional leadership on students' achievement and various school outcomes. From the previous explanation, it can be concluded that instructional leadership is leadership that focuses on developing the school's vision/goals, learning programs, and school climate. Smith and Andrews (1989) believe that instructional leadership generally is categorized into four areas of strategic interaction between school principal and teacher which include: 1.) School principal as a resource provider; 2.) School principal as a learning resource; 3.) School principal as a communi-cator; and 4.) School principal as a visible presence.

Locke (1969) suggests that job satisfaction is a pleasant emotional condition due to the individual's job appraisal as an achievement of the job. While job dissatisfaction is an unpleasant emotional condition resulting from the individual's job appraisal, the achievement is obstructive. Both terms are the functions of the perceived relationship between what is desired from the job and what is perceived as supply and demand. According to Spector (1997), job satisfaction is an expression of a person's favorable or unfavorable about work and various aspects of his work. Job satisfaction is considered an overall feeling for the job or a constellation of attitudes related to various aspects of the job. According to Gruneberg (1979), job satisfaction refers to a person's emotional reaction to a particular job.

Gruneberg (1979) states that the Job Descriptive Index (JDI) is the most accurate instrument for measuring job satisfaction. The JDI rating scale is in the form of salary, people, promotion, supervision, and work, each of which consists of several items. Gruneberg (1979) stated that the main factors of job satisfaction are considered in the following aspects: 1.) Salary; 2.) Security; 3.) Workgroup; 4.) Supervision; 5.) Participation; 6.) Role conflict and ambiguity; and 7.) Organizational structure and organizational climate. Teacher job satisfaction has consequences on teachers' attitudes and behavior, both independently and through interactions with other factors (Dou et al., 2016). Job

satisfaction plays an essential role in the overall commitment and productivity of the school organization. Nevertheless, teacher job satisfaction also significantly affects their commitment to the organization (Baluyos et al., 2019). Teachers who are satisfied with their work are also committed to working in the organization (Baluyos et al., 2019).

Based on the explanation above, it can be concluded that the activities of teachers in teaching are never free from obstacles and challenges. However, teachers still need to feel satisfied at work to create an effective organization or school. Based on the review of several research references, the authors believe that principal instructional leadership can affect teacher job satisfaction. This raises a question for the author to conduct research related to the influence of principal instructional leadership on job satisfaction of vocational high school teachers in Tempel District. This study aims to discover the principal's instructional leadership effect on teachers' job satisfaction at vocational secondary school in Tempel District, Sleman Regency, D.I. Yogyakarta.

RESEARCH METHOD

The researcher used ex post facto as a quantitative method and data collection techniques through surveys in this study. The researcher used a survey to know to what extent the instructional leadership affected teacher job satisfaction of vocational high schools in Tempel District. The research population was 128 teachers from five Vocational High schools in Tempel District. The sample was taken using a simple random sampling technique and calculated using Isaac and Michael formula. Therefore, the samples of 91 teachers were obtained. Moreover, the research instrument was in the form of a questionnaire and applied a Likert scale as the answer choices with a value range of 1-4. Each item was assessed with the following conditions: (4) Strongly Agree; (3) Agree; (2) Moderately Agree; and (1) Disagree.

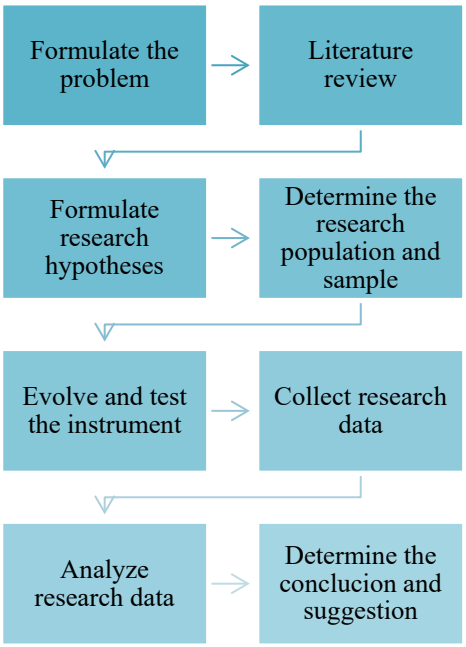

Figure 1. Research Paradigm

The research instrument had been tested for its validity and reliability before being distributed to respondents. The validity of the instrument used construct validity. Construct validity was made based on the relevant theory, consulted with the expert judgment, and continued with factor analysis. The validity test is carried out empirically using the Pearson Product Moment Correlation formula, as in Formula 1.

$$R_{xy} = \frac{n\left(\sum xiyi\right) - (\sum xi).(\sum yi)}{\sqrt{n\,(\sum xi2)(\sum xi)}\,\sqrt{n}\left(\sum yi2\right)(\sum yi2)} \quad (1)$$

Notes:
R_xy = correlation coefficient
X = score for each variable
Y = score for each respondent
n = number of respondents

The validity results show that all statement items consisting of three-dimensional descriptions of instructional leadership variables in the form of defining the school's mission, managing instructional programs, and promoting a positive learning climate are declared valid. The first dimension consists of five statement items, the second dimension consists of six statement items, and the third dimension consists of twelve statement items. This is as displayed in Table 2.

Table 2. Validity Results of Instructional Leadership Variable

No.	Dimension	Number of Item	Validity Results
1	Defining school mission	1 – 4	Valid
2	Managing instructional program	5 – 10	Valid
3	Promoting a positive school learning climate	11 – 22	Valid

The results of the teacher job satisfaction variable's validity consist of 21 statement items which are the elaboration of nine dimensions in the form of salary, working conditions, promotions, supervision, co-workers, allowances, rewards, communication, and the work itself declared valid. This can be observed in Table 3.

Table 3. Validity Results of Job Satisfaction Variable

No.	Dimension	Number of Item	Validity Results
1	Salary	1, 2	Valid
2	Working condition	3, 4, 5, 6	Valid
3	Promotion	7, 8	Valid
4	Supervision	9, 10	Valid
5	Co-workers	11, 12	Valid
6	Allowance	13	Valid
7	Rewards	14, 15	Valid
8	Communication	16, 17	Valid
9	The work itself	18, 19, 20, 21	Valid

In this study, the reliability of the instrument was tested by using the internal consistency reliability test. This reliability test is important because the instrument scale items must assess the same basic construction. Therefore these items must have appropriate intercorrelations (Creswell & Poth, 2018). The formula that is used to determine the reliability is the Cronbach alpha coefficient formula which can be seen in Formula 1. The scale's internal consistency was quantified by Cronbach's alpha (α) values ranging between 0 and 1, with optimal values ranging between 0,7, and 0,9.

The results of the reliability test for the instructional leadership variable showed the value of α = 0,968 > 0,7. Therefore the instructional leadership variable is declared reliable. The reliability test results for the teacher job satisfaction variable show the value of α = 0,984 > 0,7; therefore, the teacher job satisfaction variable is declared reliable. The researcher is also using simple linear regression analysis to analyze the research data. Simple linear regression analysis is based on a functional or causal relationship between independent and dependent variables (Sugiyono, 2013). The variables to be studied can be arranged in an equation, as can be seen in Formula 2.

$$r_i = \frac{k}{(k-1)} \left\{1 - \frac{\sum s_i^2}{s_t^2}\right\} \quad (1)$$

Notes:
r_1 = Reliability coefficient instrument
k = The number of questions
$\sum s_i^2$ = Total variance of items
s_t^2 = Total variance

$$Y = \alpha + \beta X \quad (2)$$

Notes:
Y = Dependent variable
α = Constant
β = Coefficient of X variable
X = Independent variable

The researcher conducts the hypothesis research through the t-test obtained by calculating the SPSS application version 22, comparing it with the t table, and deciding on the acceptance or rejection of hypothesis 0 (Ho). The hypothesis in this study is formulated as follows: 1.) Ho : $\beta = 0$, there are no positive and significant influences on school principal instructional leadership on teacher job satisfaction; and 2.) Ha : $\beta \neq 0$, there are positive and significant influences on school principal instructional leadership on teacher job satisfaction.

RESULT AND DISCUSSION

The hypothesis test results completed by using SPSS application version 22 reveal the results in Table 4. Based on Table 4 of simple linear regression test results, the regression equation can be determined as in Y = α + βx = 18,242 + 0,640X_1. The constant number of 18,242 indicates that if the instructional leadership variable (X) does not exist, the job satisfaction variable (Y) 's the consistent value 18,242. The regression coefficient of 0,640 indicates that for every 1% increase in the instructional leadership variable (X), the teacher job satisfaction variable will increase by 0,640.

Table 4. Test Results of Simple Linear Regression

Variable	Instructional Leadership (X)
Coefficient *B* unstandardized	α: 18.242, β: 0.640
Coefficient β standardized	β: 0.816
F	177.615
T	13.329
Significance	0.000
R	0.816
R^2	0.666
Notes	Ho rejected, Ha accepted

The correlation number (R) of 0,816 and the determination coefficient (R^2) of 0,666 can be interpreted as the instructional leadership variable influencing teacher job satisfaction of 66,6%. Other variables influence the remaining percentage of 33,4%. The results of hypothesis testing through simple linear regression are calculated by comparing the significant value and comparing the t-test value on the *t* table.

Based on the guidelines for concluding regression analysis (especially by paying attention to the significant value (Sig.) from the SPSS output), it is explained that if the significance value is less than 0,05, there is an influence between them the independent variables on the dependent. Meanwhile, if the significant value is greater than 0,05, there is no influence between the independent

variable and the dependent variable. The significant number based on Table 4 is 0,000 < 0,05; therefore, it can be concluded that Ho is rejected, and Ha is accepted, meaning that there is an influence between the principal instructional leadership variable (X) towards the teacher job satisfaction variable (Y).

The hypothesis test is completed by using a t-test based on the results of SPSS output with decision-making guidelines. If the value of *t* count > *t* table, there is an influence between the independent variable and the dependent variable. Whereas, if the value of *t* count < *t* table, there is no influence between the independent variable and the dependent variable. The calculated *t* value can be found in Table 4, while the following Formula 3 obtains the *t* table value.

$$\begin{aligned} &\text{Value } \alpha/2 = 0{,}05/2 = 0{,}025 \\ &\text{Degrees of freedom (df)} = n - 2 \\ &\qquad\qquad\qquad = 91 - 2 = 89 \end{aligned} \tag{3}$$

Looking at the distribution table of *t* value, with α = 0,025; df = 89, the *t* table value that obtained is 1,980. Based on Table 4, it is known that the t count value is 13,329 > 1,980. Hence, it can be concluded that Ho is rejected, and Ha is accepted, which means that there is an influence between the instructional leadership variable (X) on the teacher job satisfaction variable (Y). Based on the research results conducted using the questionnaires on 91 samples of vocational high school teachers in Tempel District, it is found that the coefficient of determination (R^2) between the instructional leadership variable on teacher job satisfaction is 0,666. R square value of 0,666 can be interpreted that the instructional leadership variable was having an influence on teacher job satisfaction by 66,6%. Other variables influence the remaining percentage of 33,4%.

Furthermore, this study proved the research hypothesis that there is a positive and significant influence between the leadership and teacher job satisfaction variables. This is evidenced by the significant number of 0,000 < 0,05 and the t count value of 13,329 > 1,980. Therefore, it can be concluded that Ho is rejected, and Ha is accepted, which means there is a significant and positive influence between the principal instructional leadership variable (X) on the satisfaction variable of teachers' work (Y).

The research questionnaires on instructional leadership contain three dimensions of instructional leadership: defining the school mission, managing instructional programs, and developing the school learning climate. These dimensions are in accordance with the instructional leadership framework proposed by Hallinger (2005). Meanwhile, the research questionnaires on teacher job satisfaction contain nine sub-variables in the form of salary, working conditions, promotions, supervision, co-workers, allowance, rewards, communication, and the work itself. The job satisfaction sub-variable adjusts to the main factors that support job satisfaction according to Gruneberg (1979) in the form of 1.) Salary; 2.) Security; 3.) Workgroup; 4.) Supervision; 5.) Participation; 6.) Role conflict and ambiguity; and 7.) Organizational structure and organizational climate.

The instructional leadership model corresponds to the principal's behavior and practice that is managed to improve teaching and learning activities in schools (Liu, Bellibas, and Gumus, 2020: 4). According to Liu et al. (2020), the principal instructional leadership model is increasingly popular in all parts of the world, which makes several countries have encouraged their principals to implement it. This study's results correspond to research conducted by Aji et al. (2020), which showed a positive influence between instructional leadership and teacher job satisfaction. The results of this study also correspond to the findings by Liu et al. (2020), which revealed that instructional leadership was positively and directly related to teacher job satisfaction.

The results of other studies proposed by Dou et al. (2016) were conducted at 26 Senior High Schools in China with a total of 528 teachers and 59 principals as the respondents showed that there was a significant influence of instructional and transformational leadership on teacher job satisfaction and organizational commitment mediated by the indirect impact of school climate and teacher self-efficacy. The findings of this study at least strengthen those findings that related to instructional leadership and teacher job satisfaction. This study was proved significantly that instructional leadership has an influence on teacher job satisfaction, both as a single variable and when together with teacher self-efficacy and school climate variables.

The findings of Qadach et al. (2019) revealed other evidence. It revealed that collective teacher self-efficacy and shared vision are the main mediators between the principal instructional leadership and the teacher's intention to leave. This study has a weakness in its inability to identify the relationship between the dependent variables. Therefore, it has not been able to show the more diverse relationship between variables. The research results by Bellibas and Liu (2017) also provided an overview for future research to discover more about the relationship between the instructional leadership variable and the teacher self-efficacy variable, where instructional leadership can predict teacher self-efficacy in three aspects, namely: classroom management, learning management, and student management (Bellibas & Liu, 2017).

Fathi et al. (2021) of principals' instructional leadership and teacher job satisfaction also included collective teacher self-efficacy conducted on 292 teachers in Iran, which showed that there was a positive relationship between principals' instructional lead-ership, collective teacher efficacy, and teacher job satisfaction. Their study reveals that the principal's instructional leadership has a positive effect on collective teacher efficacy and teacher job satisfaction so that teachers can increase commitment, professional involvement, and job satisfaction in accordance with the character of instructional leadership. In this study, the positive relationship was limited to two variables indicating principal's instructional leadership and teacher job satisfaction so that it can strengthen the finding that principal's instructional leadership has a significant effect on teacher job satisfaction.

The findings which in line with this research shown by Anub (2020), who proves that the instructional leadership carried out by the principal has a positive effect on teacher job satisfaction and school performance indicators. The results of the research conducted by Sindhvad et al. (2020) on the factors that affect the principal's instructional leadership capacity showed that any improvement in the instructional leadership practices carried out by the principal will increase the principal's intention to implement instructional leadership. School principals need to provide separate time for the implementation of effective instructional leadership (Sindhvad et al., 2020). Principals' instructional leadership practices are believed to improve the principal's leadership function (Sindhvad et al., 2020). This study indicates that principals carry out instructional leadership practices to affect teacher job satisfaction positively. As revealed by Bada et al. (2020), other findings also show that the principal's instructional leadership has a positive effect on the effectiveness of teachers at work.

CONCLUSION

Based on the data that have been analyzed and discussed with 30 respondents of culinary art subject teachers, the following conclusions can be drawn: 1.) The aspect of novelty related to new dishes, new cooking utensils, and new businesses in the culinary field can be given by teachers through teaching preparation, materials, methods, learning resources, and teaching media. This aspect relates to openness to reforming and thinking attitude as a beginner, which is in accordance with the nature of attention in teaching culinary art in vocational high schools. It is in a good category, with a percentage of 53.33%; 2.) Teachers can make the aspects of variation on information in teaching through teaching preparation, materials, methods, learning resources, and teaching media. This aspect relates to being alert and sensitive to contextual differences and perspectives that can increase creativity in teaching culinary art in vocational high school. It is in a good category, with a percentage of 66.67%; 3.) Teachers can apply the joyfulness aspect by knowing students' personalities through teaching methods and media. This aspect is able to change the mindset of work into a game and appreciate every moment of teaching in vocational high school. It is in a very good category, with a percentage of 60%; 4.) The teacher can carry out the aspect of meaningfulness through preliminary, core, and closing activities. This aspect relates to the student's personality, which can be applied through meaningful learning and discovery learning so as to increase the students' confidence in learning culinary art in vocational high school. It is in a very good category with a percentage of 76.67%; and 5.) The teacher carries the aspect of alertness in the preliminary, core, and closing activities. This aspect can encourage alertness and sensitivity to different perspectives according to sideways learning when teaching the theory and practice of culinary art in vocational high schools. It is in a very good category, with a percentage of 70%.

Based on the conclusions above, the implications are as follows: 1.) Teaching in the field of culinary expertise is more open to novelty. The students are encouraged to learn about new things in the culinary field; 2.) Teaching in the field of culinary expertise is more varied. The students are encouraged to learn many differences in the culinary field rather than learning about one thing; 3.) Learning in the field of gastronomy is more fun so that students do not feel burdened when learning gastronomy; 4.) Learning in the field of culinary expertise becomes more meaningful. The students are encouraged to link learning with their lives; and 5.) Learning in the field of culinary expertise is more alert. The students are always encouraged to be aware of differences in material as well as those in learning the theory and practice.

Based on the research, the following suggestions are made: 1.) Teachers can develop teaching activities starting from lesson planning, introduction, core, and closing activities by paying attention to the aspects of novelty, variety, joyfulness, meaningfulness, and alertness in learning; and 2.) The government, education offices, schools, and related stakeholders can assist teachers by creating training programs related to mindfulness learning.

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The implementation of blended learning in the new normal era at vocational school of health

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ABSTRACT

This study aimed to discover the school principal instructional leadership influence on job satisfaction of vocational high school teachers in Sleman Regency, D.I. Yogyakarta. This type of research was ex-post facto with a quantitative approach. The questionnaire was conducted on 91 teachers (71,09% response rate) to examine the influence of principal instructional leadership (X) on teacher job satisfaction (Y). Validation of the instrument used expert judgment and empirical test with the Pearson Product Moment correlation, 43 out of 43 items are declared valid. The instrument reliability test was applied by using Cronbach's Alpha. The results of the reliability test showed that all variables were declared reliable (α > 0,7). A classical assumption test was done by testing normality, linearity, multicollinearity, and heteroscedasticity. Simple linear regression was used as data analysis to test the influence of the independent variable (X) towards the dependent variable (Y). The simple linear regression results indicate a positive and significant influence between the principal instructional leadership on teacher job satisfaction (t = 13,329, p = .000). The coefficient of determination value (R^2) of 0,666 indicates that the principal instructional leadership influences teacher job satisfaction by 66,6%. Meanwhile, the remaining 33,4% are influenced by other factors.

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INTRODUCTION

The global Covid-19 pandemic has caused changes in all sectors of life, including the higher education sector (Bhagat & Kim, 2020). This has led to a striking change in the learning system, where traditional face-to-face learning must suddenly turn into online/virtual learning called e-learning or online learning or distance learning (Lapitan et al., 2021; Tavitiyaman et al., 2021). This drastic change has caused the government to require implementing the learning system to be carried out online or virtually throughout the country without making any changes due to poor infrastructure and available networks (Oyediran et al., 2020). As a result, all those involved in the higher education environment face the challenge of quickly adapting to the new normal (Lapitan et al., 2021). Therefore, educational institutions are expected to provide the necessary technology to support students' and educators' online teaching and learning process (Code et al., 2020).

According to Jeon et al. (2017), the role of educators in vocational education must also change and keep up with technological developments so as not to fall behind. On the other hand, educators must have competencies, including designing learning, conducting teaching and learning processes, evaluating learning materials and methods, conducting guidance and interpersonal

relationships with students, and providing support and cooperation in the classroom and school. According to Delialioğlu (2012), designing and using various learning resources and a good learning system will improve learning and student development. However, based on the findings above, the lack of learning resources makes students unmotivated and decreases the learning system. Gleason (2018) explained that the institution must prepare for higher education to face the era of industrial revolution 4.0 with hybrid online and in-person instruction, seamless use of video conferencing, and more asynchronous learning resources. This is done to make it easier for students to adapt to the new normal era. Based on Bruri's (2017) research, educators facing the new normal era must act as a companion for students to find and create independent learning.

On the other side, Winanti et al. (2019) show that an innovative learning system is a must for education in facing learning in the new normal era. Educators need to use appropriate learning methods and media to meet educational needs, especially the millennial generation. So it is not enough just to master the substance of the material (Prahani et al., 2020). According to Mahmud et al. (2020), the development of education through the effectiveness of blended learning is strongly influenced by technological developments that continue to grow. The use of educational materials with improved technology and pedagogical learning processes, such as games, flip classrooms, a combination of flip classrooms, and Problem Based Learning (PBL), is needed according to the results of research that have been carried out in various educational institutions (Zhao et al., 2018).

Blended learning is useful in increasing access and helping to reduce student problems (Dziuban et al., 2018). Based on previous research shows that blended learning has a positive impact on the learning process. Therefore, the researchers analyzed how blended learning has been implemented in vocational health education in the new normal era for health polytechnic students. Blended learning combines pedagogical approaches to produce an optimal learning process as a combination of face-to-face learning with teaching activities mediated by technology (Elyakim et al., 2019). Wichadee (2017) explained that using technology with this new teaching methodology can create a much more innovative learning environment. It can enable educators to organize their teaching more efficiently. This concept can shift the role of traditional learning to be much more effective (Liu et al., 2016). In general, when compared to face-to-face learning, blended learning can result in increased learning success and satisfaction for students (Moskal et al., 2013). Besides that, blended learning combines instructions carried out remotely with online-based learning and in the classroom (Poncela, 2013). According to de Jong et al. (2017), design in blended learning is one of the short-term forces driving technology adoption in higher education in the next 1-2 years.

At the higher education level, vocational education contributes to preparing skilled workforce graduates. Therefore, vocational education must prepare the learning process based on the conditions and needs of students, especially in the middle of the new normal (Verawadina et al., 2019). The weakness in traditional learning is the unpreparedness of educators and students in the learning process. This can have an impact on the quality of student learning. So that blended learning model variables are needed to help improve student learning outcomes (Pratama & Dermawan, 2020). Hartanto et al. (2019) explained that the challenge of vocational education is the quality of learning and the need for quality educators. Maulana and Iswari's (2020) research shows that online learning in vocational education has a stressful impact on students. Therefore, blended learning needs to consider the characteristics of digital technology, in general, and information communication technology (ICT), more specifically (Mahmud et al., 2020).

Technology provides an opportunity for educators to improve the quality of learning, one of which is through a blended learning model. The positive effect of blended learning using technology is the advantage of the new learning system in teaching and motivating students, which impacts learning outcomes (Bocconi & Trentin, 2014). Information communication through ICT automatically in this blended learning system can be designed by humans (Dziuban et al., 2018). In addition, adjustment of learning facilities and infrastructure and the availability of learning resources in information technology, internet, big data analysis, and computerization are needed. Gustafson and Branch (1991) explained that the learning development model has different characteristics. At the same time, it can be generalized that all types of learning development consist of analysis, design, development, implementation, and evaluation. So to identify the application of blended learning

requires a deeper understanding of the model because technology provides an important role to be implemented in the new normal era.

RESEARCH METHOD

This study uses a qualitative approach to analyze blended learning for students in the new normal era of vocational health education. According to Palmer and Bolderston (2006), qualitative research is an interpretive approach that tries to gain insight into the meaning and behavior of applying the learning media used. Therefore, we use case studies as a qualitative research method. Yin (2009) argued that the case study is an empirical investigation of the phenomenon of the learning process in the new normal era through blended learning. This research collaborates with the Medical Laboratory Technology Study Program in Associate Degree of Health Polytechnic Ministry of Health Manado.

In determining the research subject, the researcher used the purposive sampling technique. According to Patton (in Braun & Clarke, 2019), purposive sampling is a technique that is widely used in qualitative research. This is to identify and select individuals who have a blended learning-based learning experience and are currently studying at the Medical Laboratory Technology Study Program in Associate Degree of Health Polytechnic Ministry of Health Manado on fourth-semester and sixth-semester (Creswell, 2014). Researchers chose fourth-semester students because they had not followed many practical courses. Meanwhile, sixth-semester students have attended many practical courses. Based on these criteria, the participants of this study amounted to 96 students (fourth semester) and 92 students (sixth-semesters). On the other side, to maintain the research code of ethics, participants' names were withheld.

In analyzing the process of analyzing the extent to which blended learning has been implemented in vocational health education in the new normal era, the researchers distributed questionnaires to 188 students of the Medical Laboratory Technology Study Program in Associate Degree of Health Polytechnic Ministry of Health Manado. The following is a questionnaire instrument distributed to students (see Table 1). After distributing the questionnaire, we used interviews to analyze more deeply related to blended learning. Therefore, according to Winanti et al. (2019), there are question components, namely as follows: 1.) The learning system before the Covid-19 pandemic; 2.) Facilities provided by the campus for the learning process; 3.) Obstacles to the learning process during the Covid-19 pandemic; 4.) Learning materials and resources obtained; 5.) The type and learning media used; and 6.) Utilization of hybrid learning.

In the data collection process, the researchers collected data from the distribution of questionnaires conducted using the google form in collaboration with one of the related lecturers from March to April 2021. The questionnaires used were related to the use of technology and student learning independence through blended learning in the new era normal concept based on Dwiyogo (2018). Data collection through questionnaires is carried out to increase the possibility of obtaining accurate information (Palmer & Bolderston, 2006). Of the 14 questionnaires, only 13 questionnaires were declared valid because the r count was more than the r table. However, one questionnaire was declared negative because the results were less than the number of r tables, namely 0.1677.

At the same time, the results of the reliability test on blended learning are $0.870 > 0.60$. Before filling out the questionnaire, the researcher first held a meeting with students via zoom to explain the purpose of the research. This study uses structured interviews, wherein structured interviews; the researcher asks a series of predetermined questions using the same words and sequence of questions as specified in the interview sequence. Therefore, the researchers conducted interviews with ten students. These students were selected based on the results of significant questionnaire answers, namely five students who got the highest score and five students who had the lowest score so that they needed to be interviewed to deepen the analysis related to the application of blended learning that had been done. Interviews were conducted from April to May 2021. Due to the ongoing Covid pandemic, researchers conducted interviews with students via Zoom. The duration of the interview conducted by the researcher was 45 minutes.

The data analysis in this study used the steps developed by Creswell (2014) to organize data into several forms based on databases and sentences. Then during the research process, the researcher

must make notes, short notes, or summaries of important points to enable categories. In addition, identify the category according to its classification. Besides that, it integrates and summarizes the data presented through descriptive data, tables, and matrix diagrams. Furthermore, the results of the data are interpreted using a rating scale, as can be seen in Table 2. The percentage range in this study can be seen in Table 3.

Table 1. Questionnaire Instrument

No.	Aspect	Indicator	Number
1	Technology Utilization	• Internet access • Access social media • Learning Resources	1,2,3,4,5,6
2	Distance Learning Process	• Internet-based learning system • Motivation to learn	7,8,9,10
3	Provision of Facilities	• Learning facilities used	11
4	Practical Learning in the time of Covid	• Hybrid-based learning system	12,13

Table 2. Scoring Terms

Criteria	Score
Never	1
Rarely	2
Sometimes	3
Often	4
Very Often	5

Table 3. Percentage Range

No.	Precentage (%)	Criteria
1	81-100	Very Often
2	61-80	Often
3	41-60	Sometimes
4	21-40	Rarely
5	≤ 20	Never

The score in Table 2 shows the criteria for using technology in the learning process, accessing the internet, social media, and learning resources. Based on Table 2, the questionnaire results have been analyzed by calculating the percentage of values obtained by the formula, as can be seen in Formula 1.

$$P = \frac{total\ score\ obtained}{total\ score\ criteria\ skor}\ x\ 100\% \quad (1)$$

Notes:
P = Percentage
Criterion score = highest score for each item x number of items x number of respondents

RESULT AND DISCUSSION

Result

Based on the results of the research conducted, the researchers distributed 188 questionnaires to the respondents. From 188 questionnaires, only 158 respondents could be processed. Descriptions of the respondents can be seen in Table 4. Table 4 shows that Medical Laboratory Technology Study Program in Associate Degree of Health Polytechnic Ministry of Health Manado students understand hybrid learning. In Table 5, frequently used devices by students in the learning process also show

that 69.6% (110) use smartphones. In line with Kadry and Ghazal (2019), using smartphones in education can improve students learning.

Table 4. The Understanding of Hybrid Learning by Respondents

	Total	Percentage (%)
Understanding of *Hybrid Learning*		
Yes	151	95.5
No	7	4.5

Table 5. Frequently used Devices by Respondents

	Total	Percentage (%)
Frequently used devices		
Computer/Laptop	48	30.4
Smartphone	110	69.6

Table 6 shows that students experience the highest difficulty in understanding and practicing laboratory quality control courses with a percentage of 38.6%. Therefore, students have problems related to subjects that are difficult to understand and practice. In addition, clinical chemistry courses also get a fairly high percentage of 28.5%. Meanwhile, during Covid-19, students cannot practice directly in the laboratory freely, so it isn't easy to apply for the required courses in the form of practice.

Table 6. Important Courses but Difficult to Understand and Practice

Courses	Total	Precentage (%)
Hematology	10	6.3
Clinical Chemistry	45	28.5
Parasitology	20	12.6
Laboratory Quality Control	61	38.6
Laboratory Management	22	14
Sub Total	158	100

Based on Table 7 shows that students often access the internet. This can be seen with the highest percentage of 88.9%. On the other hand, students use Google more often (69%) to search for study materials than YouTube (61%). However, in downloading subject matter via the internet, students sometimes reach the criteria (55.3%).

Table 7. Technology Utilization

Indicator	Percentage (%)	Criteria
Internet Access		
1. The intensity of internet access	89%	Very Often
Acess Social Media		
2. The intensity of accessing social media via Facebook, Instagram, Twitter, and Whatsapp	74.3%	Often
Learning Resources		
3. Search for subject matter as a learning resource through Google	69%	Often
4. Looking for subject matter as a learning resource through YouTube	61%	Often
5. Conducting discussions in the form of discussion forums regarding subject matter via the internet	61%	Often
6. Downloading course materials via the internet	55.3%	Sometimes

Table 8 shows that sometimes students have difficulty following the Hybrid Learning learning system with 57.3%. However, 50.2% of students assessed that sometimes the use of technology could improve skills, solve problems, and think critically. On the other hand, 58.2% of students sometimes feel motivated in the hybrid learning process in learning motivation. Sometimes students also feel an interest in using an online learning system. However, the intensity of using the Hybrid Learning learning system is often carried out in practical courses with a percentage of 62.6%.

Table 8. Distance Learning Process

Indicator	Percentage (%)	Criteria
Internet-based Learning		
1. Having difficulty in following the Hybrid Learning learning system	57.3%	Sometimes
2. Educational institutions/institutions facilitate the Hybrid Learning learning system	61%	Often
3. The intensity of using the Hybrid Learning learning system in practical courses	62.6%	Often
4. The use of technology can improve skills, solve problems, and think critically	50.2%	Sometimes
Motivation to Learn		
5. Motivation in the learning process Hybrid Learning	58.2%	Sometimes
6. Interest in using an online learning system	55%	Sometimes
7. Motivation in the learning process via Zoom	57.3%	Sometimes

Table 9 shows that students often feel that the media influences increasing motivation to learn independently. Although they often get assignments that are done personally, 61%, according to table 10. This makes students find it difficult to develop skills to work with a team.

Table 9. Provision of Facilities

Indicator	Percentage (%)	Criteria
1. Media affects increasing motivation to learn independently	68.3%	Often
2. Get assignments done in groups	57.3%	Sometimes
3. Get tasks done privately	61%	Often

Discussion

Based on the research results, students understand hybrid learning, and they often use smartphone devices to find learning resources. However, students feel that the laboratory quality control course is the most difficult subject to understand and practice in the learning process. For this reason, with the current Covid-19 condition, students need the use of technology. From the findings, students often access the internet. This shows that real evidence of life changes has occurred before our eyes. This is in line with Tavitiyaman et al. (2021), where these changes make the learning process use the internet more often.

However, not all learning through the internet shows good results. Students find it difficult to understand the Laboratory quality control course. This is because they have to practice. Government policies related to the learning system are not in line with the facilities provided for the learning process. There are still students who rarely download subject matter via the internet because of internet quota is provided; some courses at the Medical Laboratory Technology Study Program in Associate Degree of Health Polytechnic Ministry of Health Manado cannot be done online. Although Lapitan et al. (2021) state that it takes speed to adapt to the new normal, the results of this study indicate that it is not easy to adapt, especially to the online learning process.

Not all students from various fields of study programs can adapt. Students open social media far more often during the online learning process than looking for subject matter through YouTube or Google. This is because there is no guide in conducting online learning, especially courses that require practice. Thus, these findings are not in line with Code et al. (2020), which states that technol-

ogy can support students' teaching and learning processes. This study indicates that not all teaching and learning processes can be supported through the same technology because each course has different characteristics.

On the other hand, students do not understand how to use technology to support online learning. Therefore, in line with Delialioğlu (2012) that the process of designing and using a learning system is very important. Thus, this research offers a learning system that is tailored to the characteristics and needs of the Medical Laboratory Technology Study Program students. Delialioğlu's (2012) results do not significantly explain a learning system that can improve student learning outcomes. Therefore, this study shows that blended learning is one way to improve students' understanding of the laboratory quality control course.

The burden of educators is providing learning and having to follow developments and plan to learn based on hybrid learning. However, in reality, students have difficulty in the learning process. This study indicates that, in reality, educators are quite difficult in assisting students in finding and creating independent learning, as expressed by Triyono and Utami's (2017). Thus, when educators can create independent learning, students have difficulty with this method. Innovating also requires conformity to student learning styles. This study indicates that students still do not fully feel the impact of using technology to improve skills, solve problems, and think critically. Therefore, the research results of Winanti et al. (2019) are not enough to innovate and master the material (Prahani et al., 2020). However, educators must also understand the evolving technology and student learning conditions because this study illustrates that students sometimes feel interested in using online learning systems. They have a crisis in motivation to learn through zoom.

The implication of this research is to show that so far, students have had difficulty understanding the learning process. Thus, researchers offer a blended learning system. Blended learning is an alternative to improving the learning process. Although in this study it has not been analyzed in depth. But looking at the condition of students during the online learning process shows that they are also still minimal in getting assignments in groups. Although the media influences increase the motivation to learn independently, the motivation to learn through hybrid learning is still relatively low. Based on the results of previous studies showed the effectiveness of blended learning in the student learning process.

However, educators should also consider digital technology and ICT characteristics because they feel that the motivation in the learning process through Zoom is low. In line with Maulana and Iswari (2020), online learning has a stressful impact on students. This is because they are difficult to carry out the learning process that should be practiced. But instead, they have to learn about it online amidst the Covid-19 pandemic policy. For this reason, this research focuses on the learning process carried out during the Covid-19 pandemic. This is to add to the repertoire of researchers' knowledge in the future in developing learning technology. Because learning through applications such as zoom is not enough to motivate students to learn. The results of this identification and analysis also provide an illustration that media affects increasing motivation to learn independently.

This study provides another overview of traditional learning described by Pratama and Dermawan (2020). Weaknesses in the learning process are not only found in conventional learning. Hybrid learning-based learning models can also have the same impact. This is due to the low motivation to learn students. In addition, students still often use social media not to find learning resources but only for entertainment. According to Bocconi and Trentin (2014) results, blended learning is indeed said to be effective. Therefore, it is necessary to increase learning media through blended learning.

CONCLUSION

This article aims to find out student responses in blended learning in the new normal era. This concludes that although online learning provides convenience in accessing the internet, students still use technology not to find learning resources. Besides that, they also have difficulty in understanding the courses that should be done in practice. Therefore, this research implies that technology that continues to develop must be accompanied by user understanding. Educators who are also lecturers have tried to innovate learning and are pressured to develop innovative learning

systems, but students are still not wise in accessing social media. In addition, lecturers must also analyze and plan a learning system that is easy to use and adapted to student learning styles. Therefore, laboratory quality control is considered in terms of student responses to difficult subjects to understand during the online learning process. So that further research is needed in developing a learning system that can increase student learning motivation. Not only up to motivation, but students also have to understand how to use technology well. This is a challenge for lecturers to innovate for laboratory quality control courses. Future researchers can develop innovative learning models in the laboratory quality control course.

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Design of trainer kit as a fault-finding based on electricity and electronics learning media

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ABSTRACT

According to the field of expertise, efforts to strengthen the competence of graduates continue to be pursued, especially through optimizing the learning process. Among these efforts is to use learning media that strengthen the competence of the field of study and about thinking skills. This study aims to produce a trainer kit as a medium for learning basic electricity and electronics based on fault-finding in Basic Electrical and Electronics subjects. The method used is the Richey and Klein Design and Development (D&D) method which consists of three stages, including planning (design), production, and evaluation. Experts carried out the assessment of the feasibility of the trainer kit with an instrument in the form of a questionnaire. The results of this study indicate that the trainer kit has a good performance.

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INTRODUCTION

The 21st century or the information or knowledge era has shifted the need for the world of work for the skill structure of the workforce where the role and position of brainpower are more dominant. In other words, good thinking skills from the workforce are more needed than those related to just hard skills. In line with Prosser's expression in the 16 principles of vocational education (work habits), individuals must be trained with thinking skills and work according to their job needs (Sudira, 2013). The professional competencies in electronics expertise are divided into two categories: general competencies including analytical reasoning, problem-solving, and technical competencies including analyzing, building, and evaluating electronic systems (The United States Office of Personnel Management, 2013). Thus, to be able to survive in the challenges of the 21st century, hard skills and thinking skills such as problem-solving are needed (Griffin et al., 2012; Irianto, 2017; Wagner, 2008).

The above statement is in line with the competence of Vocational High School (VHS) graduates, namely having the ability to think logically, critically, creatively and, innovatively in making decisions, as well as the ability to analyze and solve complex problems (Andrian & Rusman, 2019; A. Kurniawan et al., 2019). In addition, the aim of VHS is also to produce graduates and skilled workers in their fields (Nuri & Rusilowati, 2018; Rizaldi et al., 2021; Wening, 2017). However, in

reality, the demands for competence at the VHS level are not compatible with the implementation and learning in VHS. Based on BPS data for the last three years, the Open Unemployment Rate (TPT) of SMK graduates ranks the highest (Figure 1).

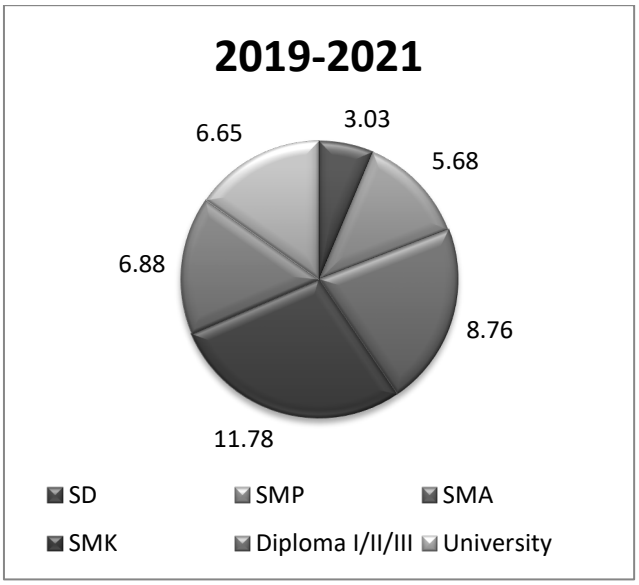


Figure 1. Open Unemployment Rate (TPT) by Highest Education Graduated (percent), 2019 – 2021 (Central Bureau of Statistics of the Republic of Indonesia, 2011)

A shift influences the factor of the high unemployment rate for vocational school graduates in workforce competence in the world of work and the influence of learning aspects for the achievement of graduate competencies, including learning models and media (Hamid et al., 2017; Setyo, 2016; Tafonao, 2018). The basic subjects of electricity and electronics in vocational high schools are principal and basic subjects because they are provisions for advanced lessons and basic work in the industry. However, the findings in the field are not many students who master and understand the basic material concepts of electricity and electronics. In addition, monotonous learning because it is teacher-centered, laboratory equipment and media sources that are less supportive affect student learning outcomes (Hamid et al., 2017; Hapnita, 2018; B. Kurniawan et al., 2017).

The average score evidences the low quality of learning for the last three years in SMK is less than 65%, which indicates ineffective learning (Setyosari, 2014; Yayuk & Sugiyono, 2019). So effective, interactive, and collaborative learning is needed to improve the achievement of skill competencies, especially thinking skills (problem-solving). One alternative is a trainer kit as a learning medium (Anshary & Edidas, 2018; Rauner & Maclean, 2008; Sukmadinata, 2008). The use of trainer kits can make it easier for students to understand learning material because it aims to concretize the abstract so that students' understanding and perceptions become better (Arsyad, 2010; Daryanto, 2016; Hariyanto et al., 2020; Nizar, 2016).

The design of trainer kits as alternative learning media has been widely developed, such as conveyor trainer kits for learning programmable logic control (Sukir et al., 2017) and development of electrical lighting installation trainer kits (Wahono & Sukir, 2020). The design of the trainer kit by the researcher is the basic electrical and electronics trainer kit based on fault finding. Fault finding is an effort by students to solve problems independently and in groups through fault-finding, which consists of five stages, namely questioning interpretation, strategy determination, and implementation (fault & signal tracking), diagnosis, and presentation (Anwar, 2016; Keddie, 2008; Pain, 1996).

In the above fault-finding stages, it can be explained that fault-finding is a form of a problem-solving approach. Students will be brought to understand the material through the process of interpreting the problem, using the knowledge base to generate several alternative answers or solutions and choosing the best solution logically. The problem in question is the core material and competencies that must be achieved, formulated in the form of questions or cases, then understood

and resolved by students through teacher facilitation. This process theoretically will be able to train and improve students' thinking skills, especially related to problem-solving skills. For the effectiveness of practical learning, media supporting the implementation of the method is an absolute requirement so that learning objectives can be achieved (Anwar, 2016; Rauner & Maclean, 2008; Sukmadinata, 2008).

RESEARCH METHOD

This study used the Richey and Klein method. The Richey and Klein method is a Design and Development model that systematically examines how to design a product, develop or produce a design, and evaluate product performance, aiming to obtain empirical data used as the basis for making products, tools, etc., models for learning or non-learning. This method consists of three stages: planning (design), production, and evaluation, commonly called the PPE model (Narulita et al., 2021; Rustandi et al., 2020; Sugiyono, 2017). In detail, the research phase using the Richey and Klein Model can be seen in Figure 2.

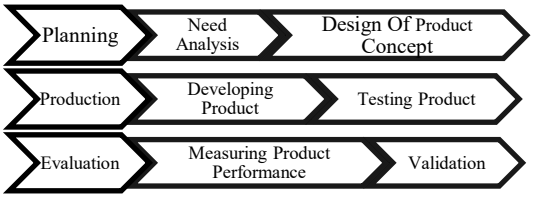


Figure 2. The Design Phase of The Basic Electrical and Electronics Trainer Kit

The steps of this research are: 1.) Analyzing and conducting needs analysis in VHS based on the basic competencies of basic electrical and electronic subjects; 2.) Designing a basic electrical and electronic trainer kit based on fault-finding; 3.) Developing a basic electrical and electronics trainer kit based on fault-finding, and the results are validated and reviewed by experts; 4.) The implementation of the basic electrical and electronic test trainer kit based on fault finding and the results are evaluated; and 5.) The validation of the basic electrical and electronic trainer kit product was carried out by two experts. The technique of collecting data is through tests with instruments in the form of questionnaires and examinations. The reliability of the assessment instrument in the form of a questionnaire was determined by calculating the reliability coefficient using the Cronbach Alpha formula

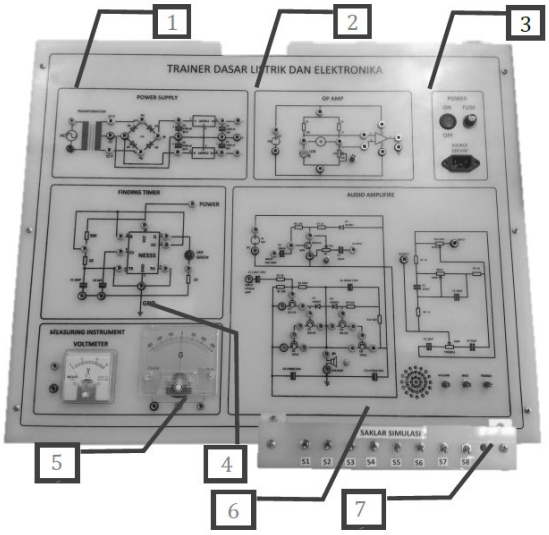
RESULT AND DISCUSSION

The first step of this research is to conduct a needs analysis on the basic subjects of electricity and electronics. The result of needs analysis that stands out is the lack of laboratory equipment to support practical activities. Based on the basic competencies of basic electrical and electronics subjects, the need in designing a trainer kit is measuring equipment including voltmeters and galvanometers as well as electronic systems, namely DC power supply, audio amplifier, op-amp comparator, and IC LM555 timer.

The second step of this research is to design a basic electrical and electronics trainer kit based on fault finding. Based on the needs analysis of the basic competencies of DLE subjects, the trainer kit is designed with four electronic systems and measurement instruments. The fault-finding method in the design of the trainer kit is implemented as a simulation switch. The simulation switch serves to break the current in the circuit in each system.

The third step of this research is to make a basic electrical and electronics trainer kit based on fault finding. The results of the trainer kit are present in Figure 3. The fourth step of this research is testing the basic electrical and electronic trainer kit based on fault finding. The results of the trainer kit test are present in Table 1.

The last step of this research is the validation of the trainer kit by the experts. Evaluation of the trainer kit product was carried out through a validation process involving two media experts. The results from media experts on the design, performance (technical), and the feasibility of fault-finding basic electrical and electronics trainer kits in learning (instructional) are present in Table 2. Suggestions given by experts are that the placement of measuring points should be reduced and the connection of lines considered.



Description: 1.) DC power supply; 2.) Op-amp comparator; 3.) Power; 4.) Audio amplifier; 5.) Measurement instrument; 6.) Astable timer; 7.) Simulation switch.

Figure 3. Trainer Kit Design

Table 1. Measurement of Basic Electrical and Electronics Trainer Kit

No.	Measuring Point	Ideal Value	Measured Value	Description
A. DC Power Supply				
1.	Stepdown Transformer Primary Terminal	$220V_{AC}$	$230V_{AC}$	Valid
2.	Stepdown Transformer Secondary Terminal	$12V_{AC}$	$13V_{AC}$	Valid
3.	Voltage Regulator LM7812 Output	$+12V_{DC}$	$12V_{DC}$	Valid
4.	Voltage Regulator LM7912 Output	$-12V_{DC}$	$12V_{DC}$	Valid
B. Audio Amplifier				
1.	Pre Amp Gain	±2 to 3x	3x	Valid
2.	Power Amp Gain	±11 to 422x	21x	Valid
C. Op-Amp. Comparator				
1.	LM741 Input Voltage	$\pm 15V_{DC}$	$12V_{DC}$	Valid
2.	Wheatstone Bridge	0	0	Valid
D. Astable Timer IC LM55				
1.	Source Voltage	5-18 V_{DC}	12 V_{DC}	Valid
2.	Trigger Voltage	VCC/3	$6V_{DC}$	Valid
3.	Threshold Voltage	2/3 VCC	$6V_{DC}$	Valid

Table 2. Media Expert Validation Results on the Suitability of the DLE Trainer Kit

No.	Aspect	Media Expert	
		Value	Category
1.	Design	0.94	Very Worthy
2.	Technical	0.97	Very Worthy
3.	Instructional	0.85	Very Worthy
	Overall aspect	0.92	Very Worthy

To determine the consistency of the results of the study, namely the consistency of media assessment instruments, the Cronbach Alpha reliability test was carried out. The reliability of the trainer kit assessment instrument was 0.774 for the validation of the assessment format and 0.750 for the trainer kit assessment. So based on the results of the reliability test, it can be concluded that the media assessment instrument has a high level of reliability with a Cronbach Alpha value of 0.70 - 0.90 (Budiastuti & Bandur, 2018; Sa'adah, 2021).

The trainer kit as a fault-finding-based learning media was developed using the PPE development model (planning, production, evaluation). This development process starts from the planning or planning stage to plan a trainer kit by setting and defining the requirements and needs in the learning process. This stage is carried out by carrying out field observations, namely in the vocational high school in the field of electronic engineering expertise, then the results of the observations are used as a reference in designing the trainer kit design. Field observation activities are carried out by conducting analysis, namely curriculum analysis, basic competency analysis, subject syllabus analysis, and field analysis. Analysis of the learning components (curriculum, basic competencies, and syllabus) aims to assist direction in making learning media by the objectives of achieving competence. At the same time, the field analysis aims to find out how the factual conditions of the learning process take place. The above analyzes are grouped into one form as a needs analysis.

The results of the needs analysis that stand out are in the learning aspect, namely the lack of laboratory equipment to support practicum activities which have led to a lack of skill competency achievement for the last three years, as evidenced by an average score of less than 65%. So we need an effective learning media for practical activities, namely a trainer kit. To be able to design a trainer kit that is relevant to learning, a trainer kit needs analysis is carried out based on the basic competencies of Basic Electrical and Electronics (DLE) subjects. However, learning refers to the media used and the learning model in maximizing media use (Hamid et al., 2017; Setyo, 2016; Tafonao, 2018).

> *Fault-finding is an effort of independent-group learners to answer questions and solve problems through error diagnosis. This method consists of several main steps which are described as follows: 1.) Questioning, carried out by explaining the circuit diagram and then accompanied by questions/cases/problems by the teacher with reference to the learning objectives; 2.) Interpretation of the problem, carried out by means of in-depth understanding accompanied by the introduction of the type of system by students, then unraveling the problem under the guidance of the teacher; 3.) Determination and implementation of strategies, carried out by selecting a strategy for tracking and localizing errors (fault & signal tracking) by students under the guidance of the teacher; 4.) Diagno-sis, carried out by means of testing, description and recording of error detection by students, as an answer to the case/problem posed, under the direction of the teacher; and 5.) Presentation, carried out by displaying the results of the error diagnosis accompanied by logical and systematic arguments, both theoretical and practical by students under the direction of the teacher (Anwar, 2016).*

The last step of the planning stage is the design of the trainer kit. The design is intended to visually describe the shape of the trainer kit that will be made. The components, circuits, and systems that will be designed in the trainer kit are obtained based on a needs analysis of the basic competencies of related subjects. Furthermore, it is formulated in such a way as to implement fault-finding in the trainer kit so that it is following the achievement of learning objectives and the competencies set.

The next stage is the production stage. This stage aims to realize the trainer kit design into one form of a complete trainer kit construction. This stage is divided into two steps: developing a trainer kit and testing a trainer kit. The development of the trainer kit is intended to realize the design of the four electronic systems used, namely DC power supply, audio amplifier, op-amp comparator, astable timer, and measurement instruments into the form of construction as shown in Figure 3. Then the construction of the trainer kit will go through a measurement test and simulations to determine the stability of the system made.

Based on the production stage, it was determined that the Trainer kit is made of acrylic and wood with a length of 66 cm, a width of 53 cm, a front height of 8 cm, and a back height of 15 cm. The center of the trainer kit consists of an electronic system, including a DC power supply, audio amplifier, op-amp comparator, astable timer, voltmeter, and galvanometer. Meanwhile, eight simulation switches are placed on the side of the trainer kit. The electrical power needed is 220 Volt AC which is then rectified through a power supply with +12Vdc and -12Vdc outputs. Other supporting components of the trainer kit are jumper connectors and other supporting electronic devices.

Based on the results in Table 1. it can be seen that the performance of the trainer kit follows its design. It is characterized by the accuracy of the measuring value at the measuring point of the circuit against the ideal value of the circuit itself. Measurements are made using measuring instruments such as a multimeter and an oscilloscope. Not only referring to measurements, but the trainer kit test is also based on the simulation form.

The form of fault-finding-based trainer kit simulation is described as follows. Students will be brought to understand the electronic system contained in the trainer kit, namely an understanding of the DC power supply system, audio amplifier, op-amp comparator, and astable timer where the four systems have been declared stable through the measurements in Table 1. But in reality, the simulation results when associated with the simulation switch or, in other words, the simulation switch is active. The results will be different from what has been described. This is a process of understanding the material by students through problem interpretation.

The problem in question is the core material and competencies that must be achieved, formulated in the form of questions or cases, then understood and resolved by students through teacher facilitation. In other words, students are required to understand in detail the workings of the implemented electronic system and be able to solve problems that may occur in the system using a knowledge base to generate several alternative answers/solutions and choose the best solution logically.

The first simulation form is a DC power supply system which consists of a transformer circuit block, rectifier, filter, and voltage regulator with different functions. When the system is activated, it will produce an output voltage that matches the installed voltage regulator (Electronics Tutorials, n.d.-a; Tooley & Tooley, 2002). When viewed with an oscilloscope, the waveform of the rectifier output does not show the waveform that should be due to the continuous flow of current. However, if the simulation switch is activated, it will produce a constant output voltage, but the output waveform of each block starting from the rectifier becomes visible. Of course, this happened for a logical reason.

The second form of simulation is an audio amplifier system consisting of a pre-amplifier circuit block, tone control, and power amplifier with different functions. When activated, the audio amplifier will amplify the frequency up to 422 times according to the input frequency (Boylestad & Nashelsky, 1996; Cathey, 2002; Tooley & Tooley, 2002). The audio amplifier system has three simulated switches on the pre-amplifier and power amplifier, which will disconnect one of the lines in the circuit when activated. If one of the switches is activated, then the gain result will be affected. For example, the simulation switch on the power amplifier is activated, then the gain becomes smaller. Why is that? Because there is one component in the circuit that loses its function.

The third form of simulation is an op-amp comparator which consists of an op-amp circuit block and a Wheatstone bridge. An Op-Amp comparator circuit compares the incoming signal voltage at the two input terminals. One of the terminals is given a constant voltage as a reference voltage, while the other terminal serves as an external signal input from another device, such as a Wheatstone bridge. The Wheatstone bridge circuit consists of 4 resistances, namely two fixed-

resistance and two variable resistance, which are arranged in series, and at two diagonal points, a voltage source is provided.

When the value of R1.R3 = R2.R4, then the value of the current on both sides is the same, so they cancel each other out. This results in the value of the current on the galvanometer being zero or in a state of equilibrium so that the voltage on both sides is the same. Meanwhile, when R1.R3 ≠ R2.R4, the current value on both sides will be more negative or more positive. As a result, the voltage on both sides is not the same (Electronics Tutorials, n.d.-b; Syech et al., 2016). The voltage on the R1 R3 side becomes the input on the non-inverting leg of LM741, and the voltage on the R2 R4 side becomes the input on the LM741 inverting leg.

The Op-Amp comparator compares the magnitude of the two input voltages and produces an output voltage based on that comparison. Where one voltage is used as a reference voltage (Vref) and the other voltage as an input voltage (Vin), if the input voltage (Vin) is greater than the reference voltage (Vref), then the output voltage (Vout) approaches the positive value of VCC, and vice versa when the voltage is Vin is less than Vref then the output voltage (Vout) is close to the negative value of VCC (Cathey, 2002; Electronics Tutorials, n.d.-c). However, when the simulation switch is activated, the voltages Vin and Vref do not affect Vout. This indicates that one of the input voltages has not changed.

The fourth simulation form is an astable timer. The astable timer works based on the input voltage at the trigger terminal and threshold IC LM555. When the threshold voltage reaches 2/3 Vcc, the timer output is in a "low" condition, whereas when the trigger voltage reaches 1/3 Vcc, the timer output is in a "high" condition (Electronics Tutorials, n.d.-a; Tooley & Tooley, 2002). However, if the simulation switch is activated, the IC LM555 output becomes "high". This indicates that the threshold voltage does not reach 2/3 Vcc when the astable timer simulation switch is activated. Thus students are guided to develop reasoning thinking to get answers to the problems posed.

Benjamin S Bloom introduced the taxonomy of thinking (bloom taxonomy) into six categories: knowledge, understanding, application, analysis, synthesis, and evaluation (Sani, 2016). Then revised by Anderson and Krathwohl into six similar categories, namely remembering, understanding, applying, analyzing, evaluating, and creating (Sani, 2016). The level of analysis or analysis means solving problems into main parts through a systematic examination of facts or information. Thus, it can be said that the trainer kit simulation form based on fault-finding is fundamentally based on Bloom's taxonomy to improve students' thinking skills logically, systemic, complex, creative, critical, and evaluative as well as problem-solving skills.

To be able to achieve problem-solving skills, media are needed that can build content or materials to be arranged logically and systematically. Media also describes objects in content in a symbolic and tangible form. And learning media can help students get the information they need and build knowledge or fulfill curiosity without dependence on the teacher as a facilitator only (Anwar, 2016). Thus it can be stated that learning media is an intermediary that makes the material being studied interesting and helps students learn, think, and understand it. One form of this media is a fault-finding basic electrical and electronics trainer kit.

Referring to the simulation form that has been described, it will improve the student's learning experience, especially in the cognitive, affective, and psychomotor aspects (Anshary & Edidas, 2018; Anwar, 2016). This learning experience will support the cone of experience theory that the more concrete the media used, the more real the experience achieved by students and can quickly master concepts. Meanwhile, the learning experience through abstract media makes it difficult for students to understand conceptual knowledge (Arsyad, 2010; Daryanto, 2016; Rauner & Maclean, 2008).

In line with what was stated by Arsyad (2010) regarding the practical benefits of using learning media, learning media can clarify the presentation of messages and information to launch and improve learning processes and outcomes. Not only that, learning media can provide students with a common experience and overcome the limitations of the senses, space, and time. So that the role of learning media can improve learning achievement and provide a more concrete learning experience (Arsyad, 2010).

The last stage of the PPE development model is evaluation. The evaluation stage is a testing activity, assessing how high the product has met the predetermined specifications, including the

achievement of the trainer kit as a learning medium. This stage is divided into two steps, namely, measuring the performance of the trainer kit and validation of the trainer kit by experts. The measurement of the performance of the trainer kit is intended to determine the feasibility of the stability of the performance of the trainer kit. Furthermore, the validation of the trainer kit was carried out by two media experts.

Based on the validation carried out by media experts on the basic electrical and electronics trainer kit based on fault finding, the score was 0,92, which was included in the very feasible category. Furthermore, the results of media expert validation on the performance of fault-finding basic electrical and electronics trainer kits got a value of 0,97, which was included in the worth it category. In addition, the results of media expert validation on the feasibility of fault-finding basic electrical and electronics-based trainer kits as learning media got a value of 0,85, which is included in the worth it category. So it can be said that the basic electrical and electronics trainer kit based on fault finding can be used as a learning medium.

The aspects assessed in the trainer kit validation are design, technical, and instructional aspects. The design aspects were assessed from the neatness of the layout, the accuracy of the measuring points, the clarity of symbols and component descriptions, the ease of access to the simulation switch, and the user's interest in the trainer kit. An untidy layout will have an impact on the attractiveness of the trainer kit to the user. Furthermore, the accuracy of the measuring point is intended to facilitate the user in determining the measuring point to be measured or, in other words, not to confuse the user in the measurement process. Component symbols and clear component descriptions can help users understand the working principle of the system's circuit. The simulation switch is a component that supports the application of the fault-finding method on the trainer kit,

The technical quality aspect is generally related to the appearance and performance of learning media. This aspect assesses that the learning media can be used easily by users, is easy to operate, and has good performance. This learning media can be used to assist in understanding the material being studied. Thus, the technical aspects (performance) are assessed based on the stability of the system work, the ease of operating the system, and the level of safety of the trainer kit (Kustandi & Sutjipto, 2011). An unstable system will reduce the effectiveness of the learning media and affect the results of user measurements and observations of the circuit in the system, so the stability of the system's work is the main thing that needs to be considered before using a trainer kit as a learning medium. The second thing that needs to be considered during the operation of the trainer kit is the safety level of the trainer kit, considering that the trainer kit uses a direct current (AC) of 220 Volts from the PLN grid. Furthermore, the trainer kit as a learning media that aims to facilitate and equalize students' understanding in an abstract context becomes more concrete, of course in operation, it must be simple or easy so that students are not confused in the learning process (Arsyad, 2010; Daryanto, 2016).

The learning aspect is generally related to the role of the learning media. This aspect assesses the usefulness of learning media in helping to understand the material and increasing motivation. Thus the instructional or learning aspect is assessed based on the achievement of learning objectives, facilitating the learning process, representing basic competencies, growing student motivation, and stimulating students' thinking levels in learning using a fault finding-based trainer kit as a learning medium (Kustandi & Sutjipto, 2011). This assessment is in line with the functions and benefits of learning media. The function of learning media is to motivate students to learn, present information, and stimulate students' minds and skills. Student skills are assessed based on aspects that refer to the competence of the field of expertise so that the basic learning media must also represent the basic competencies of the area of expertise. The benefits of learning media are increasing learning motivation and clarifying the presentation of information so that it can improve learning achievement, provide a more concrete learning experience and increase student activity in learning (Arsyad, 2010; Daryanto, 2016).

The validity of the learning media is in line with the evaluation form of the learning media. This evaluation aims to measure the extent to which the function and role of the media can be achieved or, in other words, assess the extent to which the effectiveness of the learning media (Rivai & Sudjana, 2011). The purpose of the evaluation of learning media is to determine whether the learning media is effective, determine whether the media can be improved or improved, choose

appropriate learning media to be used in the learning process, determine whether the material has been presented properly, find out whether the media helps with learning outcomes such as stated, and knowing the attitudes of students towards learning media (Arsyad, 2010; Daryanto, 2016).

The results of this study are in line with research conducted by Sukir et al. (2017), which proves that the conveyor trainer kit can effectively improve student learning experiences, especially in the cognitive, psychomotor, and affective aspects of PLC practicum learning in Indonesia. Another study conducted by Wahono and Sukir (2020) found that the electric lighting installation trainer kit developed simplifies the learning process and is useful in improving the learning experience. This study is also in line with the research conducted by Marpanaji et al. (2017), which showed that the PID controller trainer kit in the practice of learning control systems is feasible to use to improve problem-solving skills and understanding concepts. It is known that the objects and methods of applying the media in learning developed by the three types of research previously mentioned are different from this research. However, it can be related that the trainer kit as a learning media can influence learning effectively, interactively, and collaboratively.

CONCLUSION

This study shows that the fault-finding basic electrical and electronics trainer kit as a learning medium in basic electricity and electronics learning is worth it. It is characterized by a validity value of 0,85 and has a very good performance which is characterized by a validity value of 0,97. This research has limited time and conditions. Therefore, further research is needed to implement fault-finding basic electrical and electronics trainer kits as learning media indirect learning activities for basic electrical and electronics subjects.

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Embedding Content and Language Integrated Learning (CLIL) into English for specific purposes curriculum for vocational high school

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ABSTRACT

English is agreed upon as the standard language of communication throughout the world, including Indonesia. With this, teaching and learning English should be an integral part of the national education system in Indonesia because of the importance of English globally. One of the curricula in Indonesia that focuses on teaching English for Vocational High Schools (VHS) is English for Specific Purposes (ESP), where students learn English according to their needs and fields of interest. With the existence of this ESP as well as a variety of teaching methods and approaches, there is one approach that is considered truly effective in teaching this ESP program, namely the Content and Language Integrated Learning (CLIL) approach. This study aims to explore a set of literature to clarify the CLIL approach and determine if the evidence shows benefits in implementing the approach into the English for Specific Purposes (ESP) curriculum. The paper took a literature review approach and explored ten articles selected with specific criteria of being published within 2014-2020. The literature shows that the implementation of CLIL does have a positive output toward the teaching and learning process, especially for those who take English for specific purposes, such as in vocational high schools. The approach improves the linguistics aspects and the non-linguistic aspect or the students' soft skills, such as high order thinking skills, problem-solving, enhanced communication, intercultural awareness, and motivation in learning. However, to meet the success of the implementation of CLIL in the ESP curriculum, some considerations and special requirements are needed. The two distinctive preparation are the syllabus for the curriculum and the readiness of human resources; the teachers. Before applying the CLIL, the two factors mentioned need mechanisms that will support the success of CLIL for the ESP curriculum in vocational high schools. The writer proposes a model to be implemented if the curriculum for vocational high schools is going to apply CLIL. Yet, it needs more researches in the future to make sure whether the model works well or needs more improvements.

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INTRODUCTION

Content and Language Integrated Learning (CLIL) defines as a learning approach that combines language and content approaches, where a second or foreign language is not only used as a language in instructional instruction but also as a very important tool for building knowledge; such as teaching English For Specific Purpose (ESP) which focuses on certain areas, both content, and language. With the special ESP curriculum, we know that the application of CLIL using English as the language of instruction in learning is not the same from one place to another. In countries that make English one of the foreign languages to be taught and studied, such as in Indonesia, then the

level of application of CLIL will be different from other countries that make English the main language or as a second language.

The English language has been agreed as the standard medium of communication all over the world, including Indonesia. English teaching and learning have become an integral part of an educational system for seeing the importance of English globally. It is stated by Brown (2001) that English is widely used as a tool for international communication in many fields such as transportation, commerce, banking, tourism, technology, diplomacy, and scientific research. In addition, Lauder (in Mappiasse & Sihes, 2014) stated that English is being used to follow technological and scientific improvements and better job opportunities. From both statements, we could see that people learn English not only for having appropriate communication but also for having good skills in English would be useful to apply for work.

In order to prepare the readiness of human resources in Indonesia to cope up with the situations mentioned, the government via Law of the Republic of Indonesia Number 20 of 2003 explains the kinds of secondary level into; Sekolah Menengah Atas (SMA), Madrasah Aliyah (MA), Sekolah Menengah Kejuruan (SMK), Madrasah Aliyah Kejuruan (MAK) and other equivalent forms of education. Generally, we could divide it into two forms; Senior High Schools (SHSs) and Vocational High Schools (VHSs). What is the impact of that division in the English teaching and learning process? Each school has a different aim when it comes to the output of the students. Margana and Widyantoro (2017) stated that students of senior high schools have different orientations and expectations from the students of vocational high schools.

They further explain that the English textbooks for students of SHSs are designed by putting an emphasis on English for academic purposes since they are expected to proceed with their study at a high level, such as universities or colleges. Meanwhile, students of VHSs should be oriented to the development of English for specific purposes since they are projected to learn different fields according to their study programs to meet the expectation to become skillful workers in reference to their fields. According to Yoto and Widiyanti (in Hermanto et al., 2019), the objectives of vocational education are to prepare students to enter the workforce, choose a career, build competencies, and equip useful experiences in the workforce. Here we could see that the aim of the vocational high school is to create outcomes that are ready and skillful enough to work right away after graduating from school.

Rapid globalization in this era forces the government to prepare Indonesian citizens to have competitive skills to compete with global citizens. Instructor of the President of the Republic of Indonesia Number 9 of 2016 gives a framework on what kind of challenges will be encountered by VHSs in Indonesia. The first is revolution 4.0, where everything will be cyber-based that will force the way of human life, work, and communication. The second challenge emerges as the ASEAN Economic Community (AEC) result started from the end of 2015. It means that Indonesian citizens will not only compete among other Indonesians but also with citizens around ASEAN.

There are two points of view regarding this; it is an opportunity, yet at the same time, it is also a threat. It is an opportunity if the government is able to prepare the citizens with the skills needed, but it is a threat if they fail to give good provision for the citizens since they need to compete with manpower from other countries. The next challenge is the preparation for the golden generation by 2045 as a means of demography bonus. The last challenge which occurs these days is the emergence of the millennial generation with excellent characteristics such as being smart, fast learners, and actively engaged in social media. This generation is expecting flexibility in work and the freedom to work from everywhere, every time, and everybody. The skills needed to meet those challenges are not only hard skills but also soft skills requiring a lot of practice. Thus, it needs special preparation if the outcomes of vocational high schools are going to meet the needs in their workforce or career.

The emerging challenges that involve global competition coerce the educational system in Indonesia to cope with the situation. In addition to having good skills related to the field the students learn, they also need to improve their English competence for a better job opportunity and higher achievement in the work realm. Since they are going to face international competitors, English becomes one of the compulsory requirements to bridge the differences in language. Unfortunately, many learners in Indonesia think that English is the most difficult subject, even more, difficult than mathematics, physics, economics, etc. (Panggabean, 2015).

This kind of hardship is understandable since English in Indonesia is categorized as a foreign language (EFL), which means English is not widely used in daily life. As Vavelyuk (2015) stated, a foreign language can result in significant difficulties if a student has a low level of English, which is often the case in many non-English speaking countries. In nature, it is better to acquire all the language skills needed when learning English, nevertheless according to Nababan (in Dewi, 2015), in the EFL situation, the teaching of English is commonly aimed at mastering 'a restricted variety of English' which means it seems acceptable and reasonable to apply ESP (English for Specific Purposes) dealing with students' purposes in learning English at VHS that provides the specific area of competence (Dewi, 2015).

English for Specific Purposes (ESP) is quite distinctive to General English (GE). An ESP course is developed based on an assessment of purposes and needs and the activities for which English is needed (Rahman, 2014). According to Richards and Schmidt (in Margana & Widyantoro, 2017), ESP is defined as a language course or program of pedagogical practices that consist of the course's content areas and objectives with regard to the fixed specific need of a particular group of learners. Panggabean (2015) shared his view toward the relation between ESP and grammar. Panggabean (2015) stated that ESP covers various fields with different objects. However, not all English instructions for specific purposes should be approached with strict grammar. It means that the key point of English in the ESP context is by using the language, not teaching the language. By doing this, the learners are expected to gain English in a natural environment and could improve their qualifications related to the field they are taking.

From the definitions given by some experts above, it could be concluded that ESP creates a course in which English is used for relevant needs or purposes. It means that we need an approach that could embody the success of the implementation of ESP for VHSs students. Here, the writer proposes CLIL (Content and Language Integrated Learning), where Coyle et al. (in Vavelyuk, 2015) explain as the curriculum subject is taught in the non-native language, often English, with the emphasis depending on a situation. Many countries demand CLIL since it can reach two educational purposes in one step (Pipit, 2018). It accelerates students' ability both in a certain subject and the language itself. Thus, CLIL could be used as an alternative approach to nowadays curriculum for VHSs in Indonesia since it would boost the student's competence in a target language in a naturalistic environment.

RESEARCH METHOD

The study used integrative literature review methods by selecting a set of literature with specific selection criteria based on the topic being discussed by the writer and from a specific time frame followed by an analysis of their patterns. This article will review and synthesize the Content and Language Integrated Learning (CLIL) to be embedded in the ESP curriculum for vocational high schools. The criteria applied in selecting the literature are aimed at collecting recent and relevant research into the implementation of CLIL in the ESP Curriculum. The selected studies must have primary goals on supporting, showing benefits, and challenges toward the implementation of CLIL in the ESP curriculum. The time frame for the literature is seven years maximum.

To be specific, the criteria for selecting the literature that the author uses in this paper include several things, all of which must be met to be literate in this paper. The literature included in this research should be about CLIL, ESP, English language teaching, especially in vocational high schools, where the literature has been published in trusted journals between 2013-2020. The literature in this paper is more focused on case studies; it can be about a review of methods, challenges, and curriculum development related to the topic of discussion. After sorting and selecting literature for this paper from various sources on the internet, including Google Scholar and ResearchGate; The author gets ten articles or literature that meet the author's criteria. All of the literature and authors of this literature are from various countries, all of which focus on topics related to CLIL.

RESULT AND DISCUSSION

CLIL as an Alternative Approach for VHSs

That English is now used as an international language. There is a rapid growth in the users of the language all over the world. There are some factors proposed by Lestari and Setiyawan (2020) on why English is now a global language. The first factor is the diaspora of the British population to other regions. She gave an example of the migration of English to the Australian population that makes English mutate and adapt to the socio-cultural context there. The second factor is related to the history of British colonization to almost 193 countries all over the world. The differences in geographical, gender, class and social group, and age create dialects of English that may differ in the form of pronunciation, grammar, vocabulary, or other aspects of language.

The increasing numbers of non-native speakers of English raise a new challenge where many language scholars are now concerned about the world Englishes and believe that it is not possible to provide a clear definition for Standard English (Rashidi & Meihami, 2016). Kachru (in Rashidi & Meihami, 2016) proposes three concentric circles; inner, outer, and expanding (Figure 1).

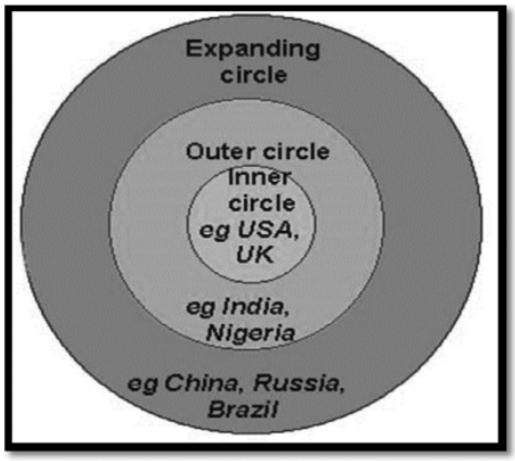

Figure 1. Kachru's Spread of English Model

The figure shows three layers; the smallest circle is the inner-circle countries in which native speakers of English are the majority of the population; for example, in the United States of America (USA) and United Kingdom (UK). The second circle shows the outer-circle countries where English has been spread through the imperial expansion of English native speaker countries. The language is used as an institutional communication tool in educational institutions, government, and others. India, Nigeria, Singapore, South Africa, etc., are examples of outer-circle countries. The outermost circle is called expanding circle, including countries that English plays limited roles, but it is starting to serve as a lingua franca for international communication 'across national and linguistic boundaries' (Rashidi & Meihami, 2016). The consequences of English used globally emerge new communities of English users (Lestari & Setiyawan, 2020). It is now necessary to realize that communication using English is common and natural to occur in native speakers' countries and through the rest of the world.

The phenomenon above should be considered when the government prepares the educational system to cope with current trends. It then could affect how we should provide an approach to teaching so that we could prepare our students to deal with that situation. Lestari and Setiyawan (2020) states that CLIL can be said to be a domino effect from the English global perspective. Further, they explain several things related to CLIL: First, CLIL is a trend of teaching English in the inner, outer, and expanding circle, where one of the trends is using English as a medium of instruction for non- English subjects in both private and public schools. Second, CLIL is an alternative method that applies the principles of the communicative approach where English is taught through non-English lessons with the aim of making learners learn languages based on content relevant to the real

context. Third, CLIL is a response to the existence of multilingual communities in Europe and English as lingua franca.

Content and Language Integrated Learning (CLIL) is an umbrella term referring to a dual-focused educational approach in which content courses are taught through the medium of a foreign language (Yang, 2015). Even though CLIL seems similar to bilingualism, Vázquez (2018) emphasizes that CLIL is a kind of additive bilingualism in which the main aim is to add a new language to the students' repertoire but not pursue any balanced bilingualism. Even though CLIL is using English as the medium for the teaching and learning process, it is different from bilingualism. Gracia (in Vázquez, 2018) mentions two significant differences between the bilingual approach and CLIL: 1.) The foreign language also takes the form of an individual subject in the curriculum; and 2.) There is coordination between the content and the language, the latter furnishing the necessary linguistic resources to assimilate the content. CLIL is also associated with the development of skills such as problem-solving, risk-taking, linguistic confidence, communication skills, vocabulary, self-expression, spontaneous talk, cultural awareness, and global citizenship (Lasagabaster & Doiz, 2017).

Those skills are needed by the students of vocational high schools when they enter the professional world since it is not only the hard skills needed but also the soft skills. Meanwhile, we could not shape soft skills in just one night. It needs continuous practice and application in daily life. The implementation of CLIL has some fundamental principles include placing students at the center of the learning cycle; teachers adapting to new forms of collaboration and coordination; an emphasis on personalized learning; the use of cross-linguistic pedagogy; and application of a comprehensive pedagogical framework which is commonly referred to as the 5c's (Pérez et al., 2018). 5c's framework is the extended version of the 4c framework described in Coyle (in Pérez et al., 2018). The 5c's covers; First, content which includes teaching and learning focused on content where the specific content taken from learning standards and learning objectives. The second is communication which covers scaffolding of vocabulary, grammatical structures, functional and academic language. Third, Cognition means that the learning process should enhance the students' critical thinking and thinking frameworks. Fourth, Competences which covers language knowledge, planning, cooperation, learner needs, interaction, cultural awareness, evaluation, development, and subject knowledge. The fifth is community which covers local, national, and global communities.

Those principles are the basics in creating a suitable curriculum using CLIL to teach in the ESP context. CLIL is not merely using English in the teaching and learning process. Rather it enhances how to use the language to cope up with their future environment.

The Benefits of Implementing CLIL

Yang (2015) proposes that the implementation of CLIL in the teaching and learning process brings benefits both in linguistics skills and non-linguistics. CLIL learners have been found to enhance their speaking skills by producing more and longer utterances, developing constructive ability in the target language and displaying a higher language level than non-CLIL learners. While in the non-linguistics area, CLIL boosts the learners' motivation to keep learners interested in foreign language learning, and it enhances the learners' mobility, employability, and intercultural communication, preparing them for future careers.

Dalton-Puffer (Pipit, 2018) proposes four advantages of CLIL: 1.) Creates conditions for naturalistic language learning; 2.) Provides a purpose for language use in the classroom; 3.) Has a positive effect on language learning by emphasizing meaning rather than form; and 4.) Drastically increases the amount of exposure to the target language. In line with those advantages proposed by Rohmah (2019) offers the benefits of applying CLIL for learners, such as: 1.) Learners are motivated; 2.) Learners developed their cognitive and communication skills; 3.) Learners communication skills progress more due to meaningful communication; 4.) Learners receive a lot of language input and output; and 5.) Learners develop intercultural awareness.

Lestari and Setiyawan (2020) mentioned that CLIL could allegedly help students to master both language knowledge and non-language subject content taught. The study examined the English vocabulary mastery and non-language subject matter knowledge and showed good results. This may be due to the meaningful learning provided by implementing CLIL since the vocabulary learning

provided is integrated with the lesson's content. This kind of implicit learning gives more exposure for the students and, at the same time, shows the context on how to use the vocabulary.

The results of some previous studies above display the benefits of the implementation of CLIL not only in the linguistics field in the form of improvement in using English appropriately, but also in the non- linguistics field related to soft-skills needed in the professional world, such as; improvement in the learners' mobility, employability, communication skills, and intercultural awareness which are beneficial for their future careers.

The Challenges of Implementing CLIL

The first complaint related to the use of English as a medium language for the teaching and learning process would be the language itself. English is very different from Indonesian Language in terms of phonology, morphology, and syntax (Panggabean, 2015), which can cause anxiety and lack of self-esteem to perform the language resulted in switching to their native language in peer-to-peer interactions (Yang, 2015). In order to fully implement CLIL in the Indonesian context, probably quite challenging, and it might take some time to prepare the 'perfect' program.

To deal with this kind of situation, the implementation of CLIL could modify the classification of CLIL courses proposed by Greere and Räsänen (in Arnó-Macià & Mancho-Barés, 2015), ranging from the absence of the integration of language and content to full collaboration between language and discipline specialist as follow; First, the non-integration model (which they term 'non- CLIL), involving independent content and language courses (less than 25% exposure to English in content courses). Second, the language for specific purposes (LSP) or Discipline-Based Language Teaching mode, similar to the theme-based model (i.e., subject-matter exposure through LSP subjects). Third, the pre- CLIL model (language/content) involves LSP courses preparing for content courses (similar to the CBI adjunct model) or content courses taught through the foreign language. Fourth, the adjunct- CLIL model, which tailors language instruction to disciplinary needs, based on the collaboration of language and subject specialists, and the last, the CLIL model involves the team teaching of dual programs catering for language and content.

The dream of implementing CLIL is quite fantastic since it aims to achieve two educational purposes in one step where it accelerates students' ability both in certain subjects and the language itself. However, the teachers as the facilitators of the learning process also play big roles in determining the success of the implementation of CLIL. Unfortunately, the research conducted by Pipit (2018) found some unpleasant results regarding the teachers' English proficiency level. Many of the teachers show no effective communication during the teaching and learning process. The students argued that the teachers' pronunciation was unclear and less understanding of students' questions resulted in dissatisfying explanations related to the subject. The deficiency analysis shows the difference between desirable English competence and teachers' existing competence (Pipit, 2018). So, if the government does really want to create skillful outcomes from vocational high school, it should first prepare the readiness of human resources. It would be better if the teachers for vocational high schools take international programs when they pursue their Bachelor's degrees of the education program, which are commonly found in universities nowadays in Indonesia.

How to Embed CLIL into ESP Curriculum?

The main objective of CLIL, where it puts the context of the language used, could bring the improvement of qualifications or skills possessed by the vocational high schools students since they are projected to work immediately after they graduate. Then, how to embed this approach into the ESP curriculum for vocational high schools? Figure 2 gives an illustration of what kind of ESP course was proposed by the writer by adapting the English Medium Paradigm proposed by Schmidt-Unterberger (2018).

An adequate amount of English knowledge must support the success of CLIL implementation. Thus it is necessary to give the students good provision before implementing the full English classroom. The pre-sessional CLIL could be implemented in the first semester of vocational high schools. The subjects being taught during this class are the basic knowledge of English to perform an appropriate English in their daily life, such as; introduction, asking for and giving

information, opinion, etc. Vocabulary mastery is also needed in this phase since this is the base for their next course level.

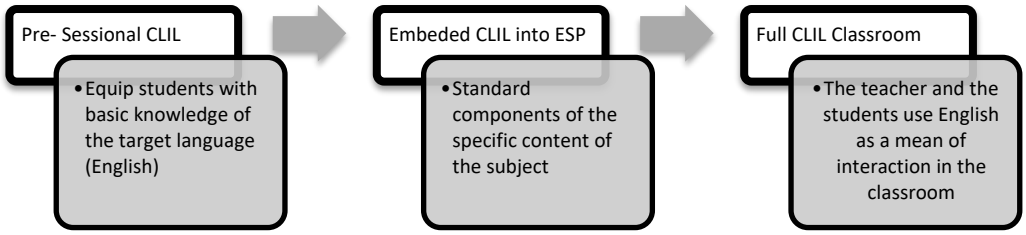

Figure 2. Embedding CLIL into ESP Curriculum

The second phase of embedding CLIL into the ESP curriculum, called Embedded CLIL into ESP, could be implemented when the students of vocational high schools are getting on their second semester. The course is designed to develop discipline-specific linguistic demands of a particular program. For example, the students majoring in Accounting are starting to get introduced to the terms used in accountant, how to prepare the presentation, present presentations, analyze trends, etc. Here, more practices are needed rather than theories. Thus, the teacher needs to play his or her role as a facilitator rather than an information-giver.

Finally, the last phase of embedding CLIL into the ESP curriculum for vocational high school is the full CLIL classroom. Starting from the third semester, the teacher and the students need to use English during the teaching and learning process fully. Create an environment where both the teacher and the students are in the real situation of using the language on the subject they are learning. As an example, in the accounting class, the teacher needs to explain the materials in (hopefully) full English, and during the classroom projects, the students also need to perform in English.

CONCLUSION

The previous discussions have shed light on how CLIL would be beneficial for the development of our educational system in Indonesia. The success of the implementation of CLIL would boost the outcomes of Vocational High Schools students so that they would be ready enough to compete with other job-seekers, not only local job-seekers but also from other countries. CLIL is believed to promote not only linguistics skills but also their soft skills since the implementation of CLIL during the learning process would create an environment where they need to employ skills such as high order thinking skills, practicing problem-solving, maintaining good communication and teamwork, and also the use of English during the learning process could enhance their confidence on using the language later in their future career.

Seeing the many advantages of applying CLIL for Vocational High Schools to prepare graduates ready to encounter the world of work, the government then needs to create a curriculum suitable for this condition. In the previous discussion, the writer has promoted a model on how to embed CLIL in the ESP curriculum. The CLIL could be applied step by step during the semesters since English in Indonesia is still considered a foreign language, so it is common to find students who are not familiar with using English appropriately. It could take some time for both teachers and students to adapt to this kind of teaching and learning environment. However, the benefits offered are quite commensurate.

Furthermore, another point to be prepared to support the success of CLIL in the ESP curriculum for Vocational High Schools is the government needs to ensure the readiness of human resources. As the key point of the implementation of CLIL, the teachers should have good skills in teaching using English for their materials. There should be different ways of recruiting the teachers for Vocational High Schools where English competence should be one of the obligatory requirements. Fortunately, there have been numerous universities with international classes for their education programs in Indonesia.

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Development of air conditioner split R32 trainer learning media in cooling and air conditioning engineering courses

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ABSTRACT

This study aims to develop learning media for AC Split R32 in the subject of refrigeration and air conditioning engineering. The method used Research and Development (R&D), the model of research used is Successive Approximation Models 1 (SAM). The model goes through iteration 1 (Evaluate 1, Design 1, Develop 1), iteration 2 (Evaluate 2, Design 2, Develop 2), and iteration 3 (Evaluate 3, and product implementation). The data collection method uses instruments in the form of observations, interviews, literature studies, and questionnaires that use a Likert scale for measurement the instrument. Based on the research analysis results, media trainers get an average of 76 in the "Very Eligible" category. Then the material results get an average of 63.5 which states that job sheets are in the "Very Eligible" category. Meanwhile, for the feasibility test on 30 student respondents, an average of 71.8 was obtained in the "Very Eligible" category. Meanwhile, based on the performance practice assessment, the average result was 83.4 out of 10 students who practiced in the "Good" assessment category. Thus, based on the development research, the trainer and job sheet can be used as learning media.

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INTRODUCTION

Education continues to develop. The development of education is related to learning, one of which is at the universities. Learning in universities is very diverse. It is characterized by the use of varied learning media to improve the quality of learning in class. One of these developments is the development of a new curriculum 2019 in the Electrical Engineering Vocational Education Study Program, Faculty of Teacher Training and Education, Sultan Ageng Tirtayasa University. The study program supports the achievement of student competencies through new courses held for the next few years.

Electrical Engineering Vocational Education Study Program is to produce graduates as prospective electrical engineering educators in the field of electrical engineering learning. Relevant skill programs for prospective teachers who graduate from the Electrical Engineering Vocational Education Study Program are electrical engineering and electronic engineering. Meanwhile, there are other skill competencies, namely refrigeration and air conditioning techniques. Competence in this field is in accordance with the curriculum in the electrical engineering expertise program. The

competency studies several materials such as refrigeration systems and installations, air conditioning systems and installations, automatic control systems, and air conditioning cooling controls.

The existence of refrigeration and air conditioning engineering courses does not exist without reason. Based on data from the Ministry of Education and Culture of the Republic of Indonesia in 2019, there were 75 vocational schools opening refrigeration and air conditioning engineering expertise competencies throughout Indonesia. The development of these expertise competencies makes the government cooperate with PT. Daikin Air Conditioning focuses on air conditioning. The collaboration aims to improve the competence of prospective graduates of students in vocational high school (VHS). In addition, with the large number of vocational students taking these skills, there is a need for prospective teachers from vocational education to improve their quality and competence in refrigeration engineering courses.

Achievement of competencies that must be possessed in the Split AC installation, namely carrying out work such as: 1.) Installation of outdoor and indoor split residential AC units; 2) Operate vacuum pump machines; 3.) Perform gas charging process; 4.) Perform gas charging process; 5.) Perform leak inspection process with leaks tester; 6.) Running outdoor unit test; 7.) Running indoor unit test. While the achievement of competence in maintenance and repair of Split AC, namely: 1.) Maintaining and repairing refrigeration/air conditioning equipment for households; 2.) Replacing electrical and mechanical components in the AC system; and 3.) Repairing damaged parts and components of the cooling system. With the implementation of the IQF-based curriculum, vocational education prepares qualified human resources and is able to be competitive in the global era.

Learning is a process that a person does with the help of teachers to get behavior change (Pane et al., 2017). Learning includes both an aspect of how something is learned and about an aspect of what is learned (Emanuelsson & Sahlström, 2008). However, practice-oriented learning in higher education certainly aims to integrate theory and practice (Helle et al., 2006). That way, all components like teachers, students, goals, materials, methods, tools, and evaluation must be used in the learning process activities. If one component is not used, then learning will not be effective (Pane et al., 2017). Vocational learning is integrating constructivism theory and evaluation theory into development content and materials to produce material that meets the requirements for vocational students (Mustapa et al., 2015). Skill-based competencies are expected to retain competent and work-ready graduates and reduce unemployment. So that vocational learning pays attention to aspects of individual skills (Ulum & Suharno, 2019). Pavlova (2009) stated that the traditional goal of vocational education, in general, is to prepare graduates for direct employment. This vocational education should provide training that is to achieve specific competencies based on the instructor's instructions, emphasize knowledge of certain industrial sectors and contain certain skills or tricks of the trade. According to Lindberg (2003), learning vocational education, apart from being a practice of manual work, is also both a reading practice and a communicative practice.

Achieving competence in the installation of Split AC certainly requires more practice than theory. Learning activities in the Electrical Engineering Vocational Education Study Program prioritize students mastering theory and professional practice skills. To support the learning process in these subjects, a media called learning media is needed. Learning media is a form of intermediary in the learning process that begins by distributing messages in the form of facts or material content from the message giver or lecturer to the recipient of the message or students. In the learning environment that is usually found in vocational education, generally using media trainers or teaching aids.

According to Parwata and Sudiatmika (2020), tools in learning are considered indispensable because of limited human abilities, especially on material topics that require teaching aids to describe them, especially in abstract learning materials such as human digestion, electricity, and others. Practice-based learning and improvement lend themselves to observing learners over time, which allows for conclusions to be drawn during the many episodes in which they exhibit self-directed behavior (Burke et al., 2014). Based on the level of inclination, practice facilities have a very high category so that they can support learning well (Aini & Sudira, 2015). Learning tools or media can be in the form of people, living things, objects, and everything that can be used by the teacher as an intermediary to present learning materials (Pane et al., 2017). The trainer is a set of tools in the

laboratory used as an educational medium, a combination of work models and mock-ups (Hasan, 2013).

The air system is an integral part of the refrigeration system to work efficiently so that it can provide hermetic capabilities such as water vapor, non-condensable gases, and other impurities so that they are not controlled at low levels (Ministry of Education and Culture of the Republic of Indonesia, 2014). Air conditioners are usually found for residential purposes (residential systems). The system requires a simple control system, namely a manual switch combined with a room thermostat and a timer switch to control the room temperature (Widodo & Hasan, 2008). Air conditioning units may be subject to renewal based on economic service life only, useful life only, or either economic service life or useful life when they are close to each other (Takakusagi, 2021).

A split system is a DX system in which the evaporator and condenser are separated and placed in different locations. Typically, the compressor is located near the condenser (Grondzik, 2007). The use of this Split type of air conditioner usually uses a type of refrigerant that speaks and can make the ozone layer thin rapidly from day to day. If previously the use of Split AC in households used refrigerants that were harmful to the environment, the government has now arranged for all these types of air conditioners to switch to using refrigerant R-32 which is more environmentally friendly. It also needs to be applied to learning with this type of AC.

Based on the problems that exist in the Electrical Engineering Vocational Education Study Program, it can be explained as follows, firstly, the unavailability of teaching aids as learning media for cooling and air conditioning techniques, thus indicating the absence of other learning media that can be used. Second, students will find it difficult to achieve the competencies that must be possessed practically in the installation of Split AC because they cannot directly know the components to be installed. Third, students will find it difficult to carry out maintenance and repair of Split AC without real experimentation with AC. Fourth, students cannot demonstrate the installation of Split AC easily and efficiently without learning media such as trainers. Fifth, the many uses of conventional Split AC that do not use R32 refrigerant so that it can harm the environment.

Based on the description of the problem above, it is necessary to develop a unit in the form of a cooling trainer as one of the teaching and learning process supporters. Thus, a research entitled development of Split R32 Air conditioning trainer was conducted in the air conditioning and air conditioning engineering course to answer these problems.

RESEARCH METHOD

The research to be carried out is a type of development research. The researcher developed a learning media in the form of a Split R32 AC trainer in the cooling and air conditioning engineering course in Electrical Engineering Vocational Education Faculty of Teacher Training and Education, Universitas Sultan Ageng Tirtayasa using the SAM (Successive Approximation Model) development model. The SAM model provides a clear stage for successful media development as a benchmark for completing and targeting everything in a fast time to achieve results. The first model of SAM is very effective and suitable for a product in an uncomplicated small study (Allen & Sites, 2012). The stages or cycles of the Successive Approximation Model can be seen in Figure 1.

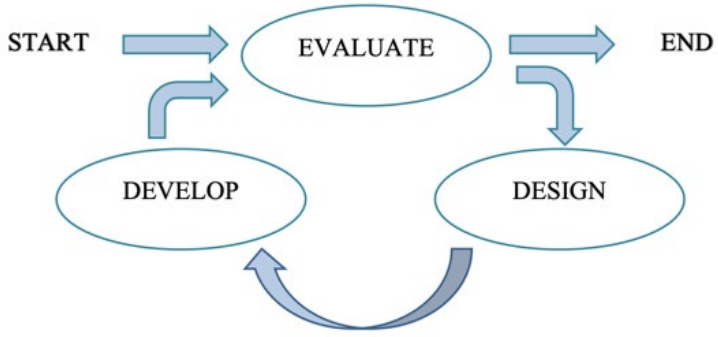

Figure 1. Successive Approximation Stage Model 1 (SAM 1) (Allen & Sites, 2012)

This research was conducted in the Vocational Education Electrical Engineering Study Program in Faculty of Teacher Education and Science Education, Sultan Ageng Tirtayasa University, with Ciwaru Raya Street, Cipare, Serang districts, Serang City, Banten 42117, Indonesia. The subject of this research is fourth semester student.

The research instrument used in the research consists of the observation, interview, questionnaire, and practice assessment sheet. Observation is a data collection technique used to observe and find facts in the field. Questionnaires were used to collect data on expert judgment validation and college student responses. The expert judgment is two instructors who are experts in refrigeration and one technician who is an expert in the air conditioner. The student work assessment sheet involves ten semesters 4 or 2019 batch students to test the feasibility of the Split AC trainer tool. The system used by the researcher is to conduct a practicum experiment on each job sheet with ten students to test the trainers and the job sheets that are tested for each job.

The observation was carried out at the electrical engineering education laboratory of the Universitas Sultan Ageng Tirtayasa. The availability of tools and materials in the manufacture of trainers in the laboratory indicates that there are already split type AC components that can be used in making trainers, but the other supporting components are not yet available. The grid diagram for observations in the laboratory can be seen in Table 1.

Table 1. Grid For Observation Sheet

No.	Aspect
1	Learning media in Laboratory
2	Size of the laboratory
3	Componen of AC Split
4	Componen of AC Split Instalation
5	AC trainer in the laboratory
6	AC Split jobsheet
7	AC Split Manual book
8	Trainer for refrigeration engineering courses
9	Size of Trainer

The Interview is conducted as reinforcement from direct observations so that the basis for problems in the laboratory of the electrical engineering education with head of laboratory. Based on the results of the interview summary, it can be concluded that the laboratory needs to have learning media as a support for practical learning. The AC Split R32 trainer learning media is made, which can be used for students' studies. The questionnaire instrument for material experts is given to the media expert to obtain an assessment and feedback on the AC Split trainer. The instrument grid for media experts can be seen in Table 2.

Table 2. Grid For Media Expert

No.	Aspect	Question Number
1	Display & Size	1-8
2	Media Coloring	9-12
3	Media Writing	13-16
4	Technical Quality	17-22

The questionnaire instrument for a material expert is given to the material expert to obtain an assessment and feedback on the content of the material in order to remain relevant to the developed learning medium. The instrument grid for material experts can be seen in Table 3.

Table 3. Grid For Media Expert

No.	Aspect	Question Number
1	Relevant to curriculum	1-4
2	Contents	6-12
3	Instructional Quality	13-20

The questionnaire instrument for feasibility for the respondent is given to the college student in the fourth semester. The instrument grid for material experts can be seen in Table 4.

Tabel 4. Grid For Respondent

No.	Aspect	Question Number
1	Learning design	1-10
2	Communication for user	11-20

The answer choice assessment table in the questionnaire consists of strongly agree (SS), agree (S), TS (disagree), and strongly disagree (STS) (Sugiyono, 2016), as can be seen in Table 5.

Table 5. Scale of Questionnaire

No.	Scale	Scoring
1	SS	4
2	S	3
3	ST	2
4	STS	1

To determine the conclusions from the results that have been achieved, criteria are set as can be seen in Table 6.

Table 6. Category of Eligibility

No.	Score	Eligibility Level
1	X>X + 1.Sbx	Very Worthy
2	$X + Sbx > X > X$	Worthy
3	$X \geq x - 1.SBx$	Not Feasible
4	X<$X + 1.Sbx$	Very Inappropriate

RESULT AND DISCUSSION

Based on the results of observations and interviews at the Electrical Engineering Vocational Education Laboratory conducted on Friday, October 2, 2020, it is known that there are no trainers for the R32 Split AC Refrigeration and Air Conditioning Engineering course, job sheets, and manuals. The learning objectives for this type of practical learning on Split AC type air conditioners are based on the 2016 SKKNI's list of Competency Units for Air Conditioning (AC) types of split AC type expertise.

The initial stage is to make an initial tool display design that aims to determine the shape and placement of components correctly, referring to the initial analysis, namely the efficiency of the shape of the tool so that it can be placed easily. To design shapes and layouts using the CorelDraw 2019 application. Here you can see the results of the initial shape design in Figure 2.

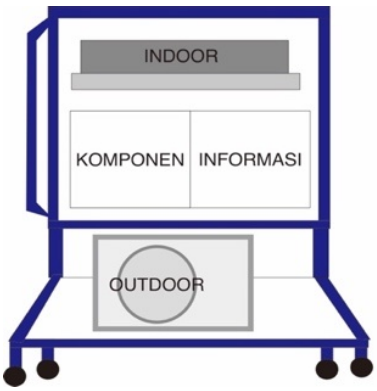

Figure 2. Desain of Iron Frame to Place the Component

The next step is to install the acrylic board on the iron frame that has been painted, then finish the installation of the components on the product and test each component whether it is good and correct. Furthermore, after the components are installed, and the electrical system behind the frame is installed, the trainer can be tested. Tests are also carried out to test whether the board and iron frame are strong enough to support, then test the performance of the indoor unit, test the performance of the outdoor unit, electrical system, and piping. Furthermore, testing is carried out with each practicum trial job. The results of the assembled AC Split R32 trainer can be seen in Figure 3.

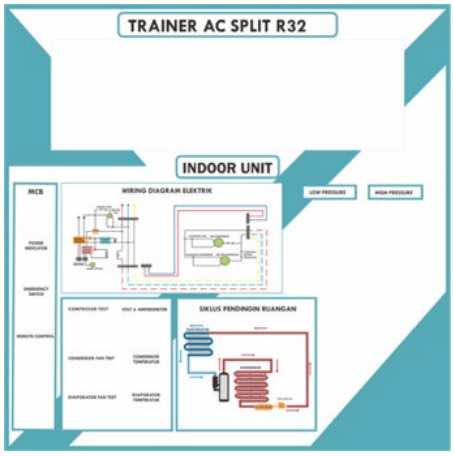

Figure 3. Desain of Layout

The next step in making the job sheet begins with looking for material from book sources as an introduction to AC Split. Researchers got five basic materials as follows: 1.) Material about Split AC Components; 2.) Material about electrical installation and piping in Split AC; 3.) Material about Service and cleaning of indoor units; 4.) Material about Vacuum in Split AC; 5.) Material Refrigerant R32 in Split AC unit; and 6.) Replacing electrical components. After getting the basic material, the researcher made the contents of the material and instructions in accordance with the previously designed competencies.

Figure 4. Trainer AC Split R32

Data validation media obtained from media experts used to get an Assessment of the aspect for the conclusion of validation of media, and material experts can be seen in Figure 5.

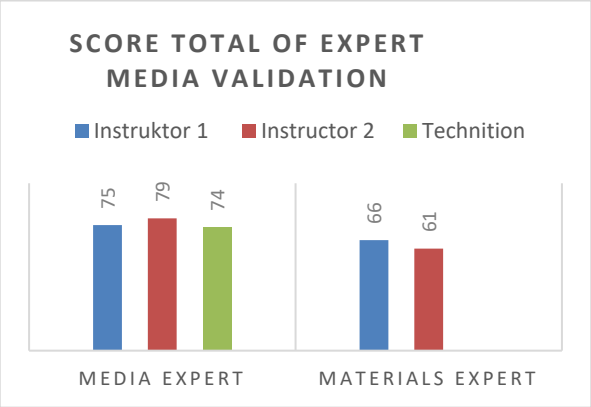

Figure 5. Graphic Expert Validation

Table 7. Conversion Table of Category of Eligibility Media Expert

No.	Score	Score Range	Eligibility Level
1	X>X + 1.Sbx	$x \geq 88$	Very Worthy
2	$x + Sbx > x > x$	$71 > x \geq 88$	Worthy
3	$x \geq x - 1.SBx$	$55 > x \geq 88$	Not Feasible
4	$x < x + 1.Sbx$	$x < 44$	Very Inappropriate

Table 8. Conversion Table of Category of Eligibility Materials Expert

No.	Score	Score Range	Eligibility Level
1	X>X + 1.Sbx	$x \geq 80$	Very Worthy
2	$x + Sbx > x > x$	$71 > x \geq 50$	Worthy
3	$x \geq x - 1.SBx$	$55 > x \geq 80$	Not Feasible
4	$x < x + 1.Sbx$	$x < 44$	Very Inappropriate

Table 9. Conversion Table of Category of Eligibility Respondents Expert

No.	Score	Score Range	Eligibility Level
1	X>X + 1.Sbx	$x \geq 80$	Very Worthy
2	$x + Sbx > x > x$	$71 > x \geq 50$	Worthy
3	$x \geq x - 1.SBx$	$55 > x \geq 80$	Not Feasible
4	$x < x + 1.Sbx$	$x < 44$	Very Inappropriate

Based on the results of the average assessment of the two media experts, it was 76, with a total score of 120 answers. So that was within the score range x < 88. So based on the data, it means being in the "Very Eligible" eligibility category. Thus, the AC Split R32 trainer job sheet product from all aspects states that it is very suitable for the AC Split R32 trainer to use as a learning medium. Based on two materials experts, a total score of 127 was obtained and from the average assessment results obtained a value of 63.5, so that the score is in the score range x < 80, so that the feasibility results have the meaning of being in the "Very Eligible" eligibility category. Thus, the AC Split R32 trainer job sheet product from all aspects states that it is very suitable for the AC Split R32 trainer to use as a learning medium.

Based on the calculation, the total score of the answers is 2154, the average result of the assessment of the 30 student respondents is 71.8, so that based on the table that is in the score range x < 80 so that the feasibility results are based on the score range means being in the "Very Eligible" eligibility category. Thus, the product is very suitable to be used as a learning medium. Based on the results, it was found that students who had demonstrated using the trainer and using job sheet were able to do so with an average score of 83.4 from the total maximum score of 100. So based on the results of the analysis of existing data, it shows that practical learning is in the psychomotor category at the student falls into the "Good" category. Thus, during practical experiments using trainers and

student worksheets is helped to achieve competence. Thus, these results mean that the trainer can be used properly so that students get good scores according to their existing competencies.

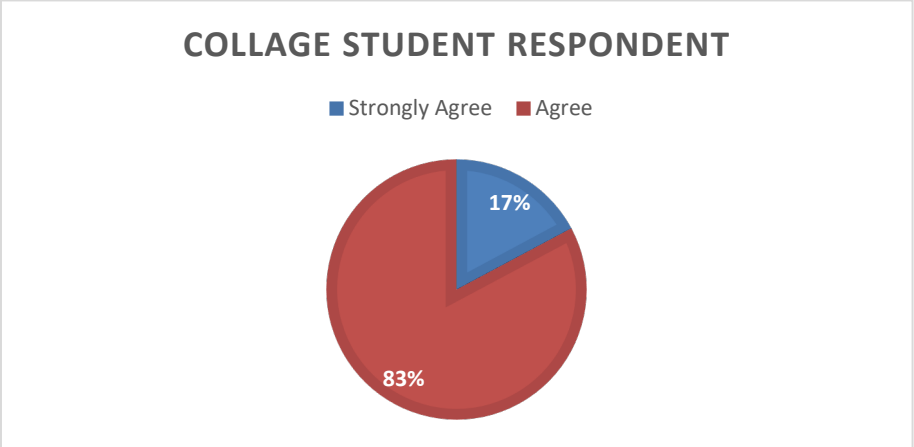

Figure 6. Diagram of Total Student Respondents Answering

Discussion

The subject of refrigeration and air conditioning engineering is currently a subject to understand the principles of cooling systems such as air conditioners, in the development of learning media that has been carried out in the form of split AC trainer kits, job sheets, and manual books which are improvements to the trainers that have been developed previously. In addition, the results of this development take into account the advantages and disadvantages of previous studies.

Based on research Adityawarman (2018), this research was motivated by the lack of AC trainer learning media in refrigeration engineering courses. The drawbacks of the media trainer are a less minimalist form, not using a digital system, lack of learning equipment, and the absence of job sheets and manuals. As a result, the media can be used to study the basic components of the air conditioner. From this research, the author develops learning media that is equipped with an attractive and minimalist form accompanied by a digital system and complete learning support equipment.

Further research was carried out by Sudarsono (2018) with the title Level feasible media learning system Air Conditioner (AC) to increase learning result. This research is motivated by the use of learning media in boring subjects and does not increase competence. The result of this research is a learning teaching aid product in the form of a table with a top board containing an explanation image of the components with the results of the feasibility of the product being said to be feasible and can be used as a learning media. Based on this research, the media that has been developed adapts the idea by providing an explanation image of the components on the split ac trainer media. In addition to the explanation of the components, it is added by explaining the cooling system workflow that makes it look interesting and easier for users to learn from the media.

Further research was carried out by Wirawan and Widjanarko (2020) with the title making split AC teaching aids as learning media for cooling system courses. The problem with this research is that the number of teaching aids in the cooling system course is less than the number of students who use them. This research focuses more on teaching aids related to machines so that the props are made very simple with the main components of split ac without any additions. From this research, the researcher developed the parts on the main components and the development of supporting components in learning. In addition, it also prioritizes electrical learning over machines. That way, the refinement of the trainer tool is made attractive, the components are complete, and provide supporting media such as worksheets.

The making of learning media following the revised 2019 curriculum with competency guidelines is obtained through the syllabus for refrigeration and air conditioning engineering courses based on the SKKNI in the field of Split-type AC refrigeration engineering skills. Based on the list of Competency Units for the Air Conditioning Industry (Air Conditioner/AC) SKKNI in 2016 expertise in the type of split AC.

According to Hasan's (2013) theory, trainers can be used to achieve competencies because the trainer can be used for training in understanding practice work as happens in the industry. In addition, with that equipment in trainer AC Split R32, the interaction between the teacher and the student can be minimized. So that the teacher can act as a facilitator and the student can understand well with independent or team learning using the provided worksheets and manual books of AC Split R32 Trainer Media. After knowing the feasibility of the AC Split trainer, the results were obtained with the distribution of questionnaires to BBPLK instructors and on a limited scale to be distributed to 30 students. The data show that Based on the results that "Very Eligible." This is, of course, due to the advantages of developing this trainer.

The split AC trainer learning media has advantages compared to previous research, including this split AC trainer learning media can help increase students' competence in the field of air conditioning, Split AC trainer learning media increases student learning motivation, media trainer is very minimalist and easy to push and place, media trainer can be easily disassembled, AC Split trainer learning media can help lecturers in providing practical learning in refrigeration, and air conditioning engineering courses, This trainer learning media has a learning job sheet making it easier to do practical learning, and this media trainer has a user manual so that the user can understand the function and know the specifications of each component.

CONCLUSION

Based on the result of research and development can be summarized as follow: 1.) Development of the Split R32 AC trainer that can be used and can be operated properly. The research and development method used is Research and Development using the Successive Approximation 1 development model with the Evaluation, Design, and Development stages. The stages of the product manufacturing process start into three stages with six steps: (1) To analyze the initial situation, needs, and goals; (2) Design; (3) Developing the layout and the installation of components; (4) The second stage is evaluating the results and making revisions; (5) Design revision; and (6) Final finishing of AC Split trainer with the size 105cm (l) x 180cm (h) along with the job sheet and manual book, feasibility testing and product implementation; 2.) Based on the results, the feasibility test of media experts got an average point of 76 in the "Very Eligible" category. The feasibility test from material experts got the average point 63.5 "Very Eligible" category. The Feasibility Test of respondents from 30 students got an average point of 71.8 in the "Very Eligible" category. Meanwhile, the Performance Practice Assessment from 10 students who did practical trainer and job sheet got an average result of 83.4 in the "Good" category.

Based on the results of the research and development of the AC Split R32 trainer kit learning media that has been carried out, there are several suggestions for the use of this trainer learning media development product. Further suggestions from researchers are as follows: 1.) This Split AC Trainer has parts made of iron, so it requires caution in its use; 2.) The material in the worksheet can be developed and added back further and in-depth; and 3.) This Split AC Trainer has a maximum current limit that is in accordance with the nameplate to avoid compressor damage.

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