

# Factors that Contribute to the Achievement of Vocational Competencies of Vocational School Students in Pekanbaru

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**Abstract**—This study aims to reveal: (1) the profile of vocational competency of CNE students in SMK N in Pekanbaru City, and (2) contributions of vocational teacher competency, practice learning facilities, student's discipline on learning, and work-based learning (WBL) towards vocational competency achievement of CNE students in SMK N partially and simultaneously in Pekanbaru. This study employed the quantitative-descriptive approach. The number of samples in this study was 187 CNE students of SMK N in Pekanbaru City. The research data were collected by using questionnaires with likert's scaling. The data were analyzed with simple and multiple regressions. The results of this study reveal that generally vocational competency of CNE students of SMK N in Pekanbaru City were above from passing standard. The percentage contribution of each independent variable towards vocational competency of the student partially was 32.3% for competency of teacher, 38.7% for practice learning facilities, 64.2% for student's discipline on learning and 43.2% for WBL experience. The percentage contribution of all independent variable towards vocational competency of the student simultaneously was 14.4% of competency of teacher, 10.7% of practice learning facilities, 18.4% of student's discipline on learning and 20.1% of WBL experience. From the results of this study, the necessity of programs to improve the quality of vocational education in the city of Pekanbaru especially vocational competence on CNE is suggested.

**Keywords**— *Contributions, Teacher Competence, Learning Practice Facilities, Student Discipline, WBL, Vocational Competence of CNE Students*

## I. INTRODUCTION

Vocational education as part of the education system has the aim of preparing someone to be able to work in a field of work [1]. The implementation of vocational education is to prepare a trained workforce. Trained labor is the nation's development capital as an investment in the future.

The principle of vocational education has the conclusion that vocational education will be effective if the learning environment where students are trained is a replica of the environment in which they will work, if where the tasks and exercises are carried out in the same way, tools and machines as those applied in the workplace. Each occupation has

characteristics of the contents that are different from one another. The process of fostering effective habits of students will be achieved if the training is given on real work. Vocational education will be effective if in training someone in the habits of thinking and working as done in the work itself, then someone can maximize their interests, knowledge and skills at a higher level.

Vocational education in the city of Pekanbaru has grown in the last decade, because many vocational education institutions at the secondary level, namely vocational schools (SMK), have been developed. However, in achieving the goals of vocational education, there are still many problems faced in the implementation of vocational education, among the several problems that occur in the implementation of vocational education in Pekanbaru City at present are schools in general do not have permanent cooperation with the industry.

The role of the teacher in shaping student competency also contributes to the achievement of vocational student competencies. An indication of the success of the teacher's role can be seen through student assessment of teacher performance in the classroom [2] [3]. From the results of observations in the implementation of learning in vocational high schools, the weaknesses of teachers in teaching include the ability to manage classes. Teaching and learning activities tend to become monotonous and less interactive. Based on these findings, it can be said that the problems found are entirely related to low competence of teachers.

Work-based learning commonly known as Industrial Work Practices (prakerin) is a characteristic of education in vocational schools. It is expected that with the implementation of internship, vocational students can build vocational competencies based on experience working in a real location in accordance with their competency expertise

Based on observations that have been made on the implementation of internship in the State Vocational School in Pekanbaru, it is found that there are students who do internship not in the place they should be. Most of them especially for Computer and Network Engineering (TKJ) Competency were placed in the government offices in the administration division. The internship which is actually

applied to the world of work and the computer and network industry has not been done optimally.

Achieving student competence also depends on the learning environment and student learning discipline from individual, family and school reviews. Based on observations from the field, there are still individual students who ignore the bell when the lesson will start, and they even tend to be late even though according to the rules the student must be in class 5 to 10 minutes before the lesson begins. Other indications are there are still students who do not listen well about the subject matter delivered by the teacher. From these findings, it can be concluded that neglect and violations that occur are indicative of the attitude of the discipline of learning that is still lacking in students in school rules and regulations. The students are not punctual and do not yet have responsibilities as a student.

The purpose of the study was to provide a description of the level of vocational competence of TKJ students in SMKN Pekanbaru City and to analyze the contribution of the contribution of the competency variables of vocational teachers, practical learning facilities, student learning disciplines and experience of apprenticeship to the TKJ students' vocational competency at State Vocational Schools in Pekanbaru City. It is expected that the benefits that can be drawn from the results of the research in order to become a scientific study are used as a reference in the implementation of vocational education program evaluations at the level of secondary education that have been running in Pekanbaru City. The results of research can help the Pekanbaru City Education Office in making policies to determine relevant programs for increasing the competence of vocational teachers in order to achieve more effective and high quality vocational education goals through scientific and comprehensive studies of the findings and suggestions given. Furthermore, the results of the research can be used as scientific references for the development of the treasury of knowledge in the field of technology and vocational education in Indonesia, especially in the city of Pekanbaru.

**II. RESEARCH METHOD**

**A. Type of Research**

This study includes ex-post facto research, where research is conducted to examine an event that has occurred through observing and analyzing factors predicted to have an influence and contribute to the events observed. The approach used in this study is a quantitative descriptive approach to get a general picture related to the theory, assumptions, of the variables of vocational teacher competency, practical learning facilities, student learning discipline and experience of internship as well as achieving vocational competence of students with the form of research data in the form of quantitative data.

Inferential analysis is done by analyzing the relationship and the influence as well as contribution of each independent variable to the dependent variable. The relationship obtained is then analyzed to obtain influence data and the value and form of contribution of each independent variable to the dependent variable by using a simple linear regression test and multiple linear.

**B. Research Time and Place**

The study was conducted within 7 months from October 2017 to April 2018 which was divided into 3 stages. The stages of the research carried out include the stages of preparation and observation, the stages of implementation and subsequently the stages of writing and reporting of research results. The location of the study was at the State Vocational School in Pekanbaru which taught the TKJ Competency in all cities in Pekanbaru.

**C. Research Subject**

The subjects in this study were all students of class XII TKJ Vocational Schools in Pekanbaru City in the Academic Year 2017/2018, amounting to 397 students. The sample in this study consisted of 187 students. The number of samples from each school was taken based on the percentage of representation in the total population in accordance with the proportional sampling technique. Details of the number of samples can be seen in Table 1.

Table 1. The Number of Research Samples

No	School	Population	Sample
1	SMK N 1	101	48
2	SMK N 2	72	34
3	SMK N 4	68	32
4	SMK N 5	60	28
5	SMK N 7	96	45

**D. Data Collection Technique**

To achieve the objectives of the research, data collection methods are used that are considered suitable for use in conducting research while the methods used include observation, documentation, and questionnaires and interviews. The questionnaire in this study is to obtain data from each independent variable regarding the variable ability of vocational teachers, practical learning facilities, student learning discipline and practical experience.

The questionnaire used was a collection of statements with a Likert scale response measure. The likert scale used has been modified from a scale of 1-5 to 1-4 by removing the mean to avoid confusion in data analysis.

Questionnaire data were obtained from the results of questionnaires that have been filled out by students as research samples. Students filled out the questionnaire according to their circumstances and perceptions for each statement listed on the questionnaire. In addition to the questionnaire, the interview data were also collected from the research sample. The interview in this study is used as a form of confirmation of the questionnaire data that has been obtained and serves as supporting data in the data analysis stage.

Observations in this study were conducted to observe the condition of TKJ practice learning facilities in state vocational schools in Pekanbaru City. In this activity the data collected is in the form of a real condition of the school environment related to the fulfillment of facilities and infrastructure for TKJ practice learning.

Documentation is used with the aim of obtaining visual data, such as photographs of the state of the completeness of

facilities and infrastructure, and a copy of vocational competency test results of vocational students in the competency of TKJ expertise in the city of Pekanbaru as well as documents that are considered to support the completeness of the data requirements needed in this research.

The instruments in the study are arranged according to the variables that are used in the study. Variable development is done by developing all aspects and indicators that are in accordance with the basic concept of the theory of each variable. Aspects and indicators that have been described as derivatives of variables would be further specified specifically into the form of statement items compiled into a research instrument. The vocational teacher competency instrument on Computer and Network Engineering Skills Competencies is presented in a closed questionnaire consisting of positive and negative statements and is equipped with four (4) alternative answer choices according to the Likert scale. Furthermore, the questionnaire was distributed to students who in this case became the research sample. The development of the teacher competency instrument grid is based on aspects of competency indicators derived from the study of concepts and theories.

Validity analysis is used to ensure the research instruments used are feasible to measure what should be measured. The validity of the contents of the instrument was analyzed rationally through professional judgment by an expert validator, a lecturer at the UNY Infrastructure Program. The aspects analyzed in content validity include the editorial sentence, language suitability and the suitability between indicators and variables. After content validity, the next step is to test the instrument. The trial results are then used to analyze the empirical validity of all instruments for each independent variable in the study. The results of the empirical validity analysis are presented in Table 2.

Table 2. The Results of Instrument Trial

<i>No</i>	<i>Research Instrument</i>	<i>Number of Valid Item</i>
1	Vocational Teacher Competency	36
2	Practice Learning Facility	23
3	Learning Discipline	19
4	Prakerin Experience	25

*E. Data Analysis Technique*

After the research data were obtained through the distribution of questionnaire for each variable, the data from all research samples originating from the questionnaire were analyzed for each variable. The analysis conducted is descriptive statistical analysis and inferential analysis using statistical processing software, namely SPSS version 17.

Descriptive analysis in quantitative research serves to determine the statistical values of the sample data in the form of descriptive data. The purpose of descriptive analysis is that the research data can be processed according to the classification and type of data groups and also to be able to assist researchers in summarizing quantitative data that are numerical in nature. The purpose of the discussion of

descriptive statistics is to provide researchers with an actual picture of the state of the object and the subject of research through quantitative information that can be explained.

Inferential analysis is done to draw conclusions from sample data and generalize it into population data. Generalizing the conclusions of the sample data is through hypothesis testing and answers to research questions by applying parametric statistics. The parametric statistics used are simple and multiple correlation analysis techniques as well as simple and multiple linear regressions with a 5% error level as a reference to the rejection of the hypothesis criteria.

**III. RESULTS AND DISCUSSION**

*A. Vocational Competencies of TKJ Teachers*

Productive teachers in vocational education are those who are professional and have an understanding of building vocational-based teaching in terms of practical, pedagogical teaching and clinical work experience from the areas of expertise occupied [5] [6]. From this opinion, the definition of TKJ productive vocational teachers is individuals who have technical expertise in the field of computer and network engineering occupations that are professional and can organize learning in the form of training in accordance with the competencies required by the workforce in the areas of computer and network. The teachers also should be able to design learning theoretically or practically both in school and in industry.

The performance of a teacher can be assessed by students, as individuals who have direct interaction with the teacher during the process of teaching and learning activities. Teacher performance is defined as a form of behavior and the results are assessed by students, the behavior of a person then changes from the theoretical stated in measurable actions [7] [8]. Based on these definitions, the teaching performance of teachers in the TKJ field that can be assessed by students is how the quality of learning provided by teachers during the teaching and learning process in the classroom or workshop. From this description, it can be formulated that the teacher's performance is an assessment of the behavior produced by a teacher in carrying out his or her duties as an educator and teacher when teaching in front of the class. A teacher's performance in a class is assessed by students in learning activities. Teachers as leaders in learning have competencies that represent their function as learning agents at every level of education, especially in vocational secondary education in TKJ expertise competencies.

The level of competency of TKJ vocational teachers can be classified by determining the interval for the classification of research score data based on ideal averages and ideal standard deviations. The number of frequencies for each quality category interval on the vocational teacher competency score can be stated in the following Table 4.

Table 3. Competency Level of TKJ Productive Teacher

No	Interval	Category	Frequency
1	$X \geq 117$	Very High	39
2	$90 \leq X < 117$	High	135
3	$63 \leq X < 90$	Moderate	13
4	$X < 63$	Low	0

For the category of vocational teacher competency quality from the results of a questionnaire towards 187 student respondents as a sample, there are no students who provide an assessment of vocational teacher competencies with poor quality. According to research data obtained, 6.95% of sample students give an assessment of the quality of vocational teacher competencies in the quite good category, and 20% of the total student respondents had the perception that the quality of vocational teacher competencies was very high. Moreover, 72.19% of the respondents in total thought that the quality of vocational teacher competencies was high. From these data when compared to the average overall questionnaire data score of 109 with a good quality category, then in general vocational teacher competencies according to the perception of TKJ students from the study sample have high quality.

**B. Learning Facility**

The conditions and quality of practical learning facilities need to be considered on the grounds that conditions and quality directly influence the educational process. Practical workshop as a learning facility requires a good design and planning system and in accordance with its needs so that the functions and objectives of the procurement of practical workshops in vocational education programs can be used optimally. In the design of a practice workshop, there are some basic things as a reference for the development of a workshop and also a practical laboratory, including the shape and physical condition of the workshop and laboratory, the selection of equipment and organizational management models used and the organization of equipment.

Reference standards for the provision of facilities and infrastructure in vocational schools have been regulated in detail based on Minister of National Education Regulation Number 40 Year 2008 [9] which states that a SMK/MAK at least has infrastructure that is grouped in general learning spaces, supporting spaces, and special learning spaces. The special learning space includes practice space that is tailored to the needs of the competencies required in each expertise program and expertise competencies.

Achieving a competency in an educational program can be seen from the quality of practical learning facilities provided as well as the opportunity for elements of the school to use the facilities and infrastructure in supporting educational programs. As a direct user of the learning facilities found in school, student assessment is important [10] [11] [12]. Positive assessment by students of the optimization of learning facilities will be an important indication in planning and meeting learning facilities, because students interact with learning facilities in order to directly improve learning achievement. Based on this opinion, it can be said that students' perceptions of the needs of learning facilities need to be considered by the school in order to improve the quality of learning achievement which is the goal of an educational process.

For the category of quality of completeness of learning facilities based on the results of the questionnaire is based on the perception of 187 student respondents as a sample, there are no students who provide an assessment of the completeness of practice learning facilities with poor quality. According to the research data, 10.69% of the sample students gave an assessment of the quality of the practical

learning facility completeness in the quite good category, and 19.78% of the total student respondents had the perception that the quality of the practical learning facility was very good. Furthermore, 69.51% of the total respondents overall assume that the quality of completeness of practice learning facilities is good.

**C. Student Learning Discipline**

For student learning discipline variables, the level of student learning discipline can generally be classified in the form of interval categories of research data scores based on ideal averages and ideal standard deviations. The ideal average score (Mi) of student learning discipline variables with a total of 19 statements in the questionnaire was 47.5 and the ideal standard deviation score (Sbi) was 9.5. The number of frequencies for each quality category interval on student learning discipline scores can be stated in the following Table form.

Table 4. Learning Discipline Level of TKJ Student

No	Interval	Category	Frequency
1	$X \geq 61,75$	Very High	89
2	$40,7 \leq X < 61,75$	High	97
3	$33,25 \leq X < 90$	Moderate	1
4	$X < 33,25$	Low	0

The research data shows that 51.87% of students from the total sample give a personal assessment based on a questionnaire that they have a high level of learning discipline while students who consider that they have a very high level of discipline has a percentage of 47.59%. From the data that has been described, it can be seen that the distribution of data from the learning discipline assessment questionnaire by students in general is spread in high and very high groups, with students in high classification having a greater percentage than other categories.

Discipline is part of reflecting one's personality in carrying out his capacity as a social creature, and the use of the term discipline shows how one's responsibility in carrying out its functions in a social community, work and society [13]. The term disciplines that are often used in daily life include work discipline, legal discipline, scientific discipline and also the discipline of learning. In the learning process, the teacher has a role in shaping student discipline in learning, as well as building student love for lessons, books, respecting time and obeying discipline and knowing how to learn and the actions to be taken.

Obeying the rules of school discipline plays an important role in the achievement of expectations and goals, especially in terms of education. Therefore, students need to train themselves to become disciplined individuals by strengthening and accustoming self-control and compliance with school rules [14], [15]. Discipline attitude should be a trait that arises from within students themselves because if discipline is imposed on students such as supervision of students, this is precisely contradictory because when students are no longer under teacher supervision, the students will no longer obey the rules and signs that have been made by teachers and schools in the learning process.

**D. Industrial Work Practice**

For the TKJ students' internship experience, based on data obtained from the research results, the ideal average score (Mi) of the internship experience variable with a total of 25 statements in the questionnaire was 62.5 and the standard deviation of the ideal score (Sbi) was 12.5. The level of experience in general shows that apprenticeship can be classified in the form of data category intervals of research results based on the ideal average and the standard deviation. The number of frequencies for each quality category interval on a student's experience can be seen in the following Table.

**Table 5. The Quality of Industrial Work Experience of TKJ Students**

No	Interval	Category	Frequency
1	$X \geq 81,2$	Very Good	71
2	$62,5 \leq X < 81,2$	Good	114
3	$43,75 \leq X < 62,5$	Pretty Good	2
4	$X < 43,75$	Not Good	0

In general, the data shows there is a predominance of the percentage of students from a total sample of 60.90% who have a classification of the level of experience of apprenticeship belonging to the good category, while the percentage of students included in the classification of experience level of apprenticeship with an very good category is only around 37.96 % of total sample. From the data that has been described, it can be seen that the distribution of internship experience owned by students personally after participating in the apprenticeship activities based on questionnaires generally spreads to good and very good groups.

In implementing the internship program, aspects of experience gained by TKJ students as the main actors in this educational model include aspects of suitability for location and time of implementation of the internship. Based on the competencies required by a graduate in the field of computer and network engineering, the appropriate location is a business or industry that engages in sales and development of computer systems or computer network service providers such as Software House, Internet Service Provider or computer equipment trading industry.

Aspects of work guidance become things that need to be considered, because through guidance from companies, students will have the skills and experience in working, especially in the TKJ field. From the description of the data of all the variables in the next study, the analysis is carried out to predict the vocational competence of students based on contributions of all independent variables.

Industrial work practice with its name or international term as work based learning is a form of implementing a dual system of vocational education in Indonesia. Educational activities that implement training and learning and are applied with an internship working model in the business or industrial sector. Implementation of internship must be relevant to the field of competency (ability) of students [16]. Internship activities include learning activities because internship is conducted to provide knowledge about

the world of work to students. In other words, students are not limited to only getting theoretical learning from school.

**E. Inferential Analysis**

To test the hypothesis in multiple regressions, the test model used is the F test from the data displayed in the Anova analysis results table. The assumption of acceptance of the hypothesis for this multiple regression is if the value of  $F_{count} > F_{table}$  then  $H_0$  is rejected, so it is found that the value of  $\beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 > 0$ . From the data table, it is obtained that the results of the analysis shows that the value of  $F_{count}$  is 66.412 with a significance value of 0.000, if the value of  $F_{table}$  at a significance level of 5% with degrees of freedom  $df_1 = 4$  and  $df_2 = 182$  then obtained value of  $F_{table}$  (0.05 , 4,182) for research data is 2,421. Therefore,  $F_{count}$  (66.412)  $>$   $F_{table}$  (22.421) and  $P_{count}$  value (0.000)  $<$  0.05, it can be concluded that  $H_0$  is rejected so  $\beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 > 0$  means the competency of vocational teachers, completeness of practical learning facilities, learning discipline and Internship experience together contributes positively to the vocational competency of vocational students in the competence of computer and network engineering expertise. From the data in Table 35, the multiple regression equation models of the research data can be written as follows.

$$Y = 30,731 + 0,144X_1 + 0,107X_2 + 0,184X_3 + 0,201X_4 + e$$

From the regression equation obtained, it can be stated that the contribution of each independent variable in this study will provide an increase in the predictive score of the variable vocational competence of students by the cumulative total of all regression coefficients of the independent variable of vocational teacher competencies ( $X_1$ ), completeness of practical learning facilities ( $X_2$ ), student learning discipline ( $X_3$ ) and practical experience ( $X_4$ ). The multiple regression equation models can be used to predict the achievement of students' vocational competencies in TKJ expertise competencies at State Vocational Schools throughout Pekanbaru.

**IV. CONCLUSION AND SUGGESTION**

**A. Conclusion**

The profile of vocational competency of TKJ students in State Vocational Schools in Pekanbaru City is at a high level of achievement classification supported by a high level of competency of vocational teachers and completeness of practical learning facilities which according to students are already good. The level of discipline of learning and practical experience possessed by TKJ students in general in the Pekanbaru City Vocational School is also at a high classification.

From the interaction of research data on the variables of vocational teacher competency, completeness of practical learning facilities, learning discipline and experience internally together and partially contributed positively to the improvement of the achievement of vocational competency

of TKJ students in all State Vocational Schools located in Pekanbaru City.

### B. Suggestion

From the research that has been done, further recommendations are given for improvement. Suggestions are given to parties related to this research. Students need to always have the will to try to build broad insights about the world of work and skills in working both soft skills and hard skills and have the determination to increase the capacity of vocational competencies from within oneself. Meanwhile, for teachers, with their vital role as educators, teachers should have the awareness to always try to increase their capacity as professional educators.

For schools and education agencies in Pekanbaru City, the implementation of vocational secondary education should conduct an evaluation of the availability of practical learning facilities available at vocational high schools. In addition, it is suggested that there is a commitment to strong cooperation between the schools in this case SMK with the business and industry world through the education service in order to create a more optimal dual system education program. This is important in order to create graduates of professional vocational workforce in the field of computer and network engineering expertise that will bring about the impact of change on the economic growth of the Indonesian people, especially in the city of Pekanbaru.

For further research, it is recommended that data collection are undertaken as a whole observation activity related to the teaching ability of the teacher, student discipline while at school, and the process of acquiring knowledge during internship. Analysis of the data used should be path analysis so that the relationship pattern of each independent variable to the dependent variable can be observed in more detail.

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