Pedagogical competence of productive lesson teachers of vocational high schools in Banten province

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Abstract. This study aims to reveal the pedagogical competence of productive subject teachers in Banten Province in the learning process, the urgency of the pedagogical competency aspects of productive subjects and the perception of productive subjects' teachers on pedagogical competencies. This research is a quantitative descriptive study conducted in 16 Vocational High Schools in Banten Province. Data collection techniques used were questionnaires, observations, and interviews. The data analysis technique used is descriptive statistical analysis. The results of the study are as follows: (1) The pedagogical competence of productive subject teachers in Vocational High Schools in Banten Province is generally included good category, (2) the urgency of the pedagogical competence of productive subject teachers at Vocational High Schools in Banten Province is generally included fundamental category, and (3) teacher teaching and learning activities there are still difficulties in the application of pedagogical competencies. Efforts by teachers to improve competence and knowledge are in participating in workshops and discussions with peers to increase knowledge and knowledge.

1. Introduction

The teacher has a strategic position to improve the quality of education because the teacher is the direct implementer of education and learning [1]. When carrying out their duties, teachers must have the competence to support the teaching and learning process. Teachers regarded themselves as coaches [2]. Appropriate learning arrangements can increase teacher motivation to use new teaching methods so learning is more effective. It has a positive influence on increasing the competence of professional teachers [3]. In the Republic of Indonesia Minister of Education Regulation No. 16 of 2007 concerning academic qualification standards and teacher competencies, there are four competencies that are owned, with one of them being pedagogical competence. That competency must also be had by a Vocational High School teacher, especially on productive subjects, because Vocational High Schools not only discuss theories related to specific vocational fields but also carry out vocational practices to complex stages.

Vocational High Schools are part of the education system that prepares someone to be more able to work in one occupational group or one occupation than other fields of work [4]. Vocational High...
School teachers must develop their competencies to follow the advances in technological science, including Vocational High School teachers in Banten Province, Indonesia. This becomes important because many businesses and industries are scattered in Banten Province, so it is hoped that students graduating from Vocational High Schools will be directly absorbed. This potential has not been matched by teacher competency, which can be seen from the achievement of the average Teacher Competency Test (UKG) in the 2015 level of Vocational High School in Banten Province, which is 56.23, which is still below the average of Teacher Competency Test for National Vocational High School level 58.30, which is determined by the Directorate General of Teachers and Educational Personnel.

The average results of the Teacher Competency Test can be used as a representation to find out teacher competencies and to be part of a continuous flow of teacher competency improvement. These results are a description of pedagogical competence and professional competence which can later be improved to achieve quality education. Seeing the importance of the teacher's pedagogical competence and the lack of competence of Vocational High School teachers, makes the writer want to discuss the pedagogical competence of productive subject teachers at the Vocational High School in Banten Province along with the teacher's perceptions and efforts to improve the competency.

The teacher as an educator or instructor is in charge of fostering the development of knowledge, attitudes and skills. Although the task as a teacher has been completed, the role of the teacher as an educator and mentor is still ongoing [5]. According to Law Number 14 of 2005 concerning teachers and lecturers, teachers are professional educators with the main task of educating, teaching, guiding, directing, training, evaluating and evaluating students in early childhood education through formal education, primary education and secondary education. Teachers are experts for teaching and learning. Teachers must learn to overcome their belief systems and learn how to support a growth mindset in their students. This is evidence that pedagogical competence has a vital role in shaping quality learning [6]. Their core tasks are the target-oriented and scientifically sound planning, organisation and reflection of teaching and learning processes as well as their assessment and systemic evaluation. Teachers are the future curricular development and implementation of teaching practices [7]. The quality of their instruction measures the professional quality of teachers. The role of learning tools has a significant influence on learning success [8]. Thus, it can be said that the teacher is a profession that has an area of expertise as an educator (teaching and learning) that has the competence for students in developing knowledge, attitudes and skills towards better based on process assessment and evaluation.

Vocational High School teachers in Indonesia carry out teaching and learning in three subject groups, namely adaptive, normative and productive. To achieve the basic concept goals of Vocational High Schools, it is productive subjects that characterise Vocational High Schools according to their respective vocational fields. Productive subjects are training courses that function to equip students to have work competencies by Core Competencies and Basic Competencies.

Vocational High School teachers in productive programs have specific professional characteristics and requirements, namely (1) Having adequate practical expertise in all productive study areas, (2) Able to organise learning (training) that is relevant to the competencies needed by the world of work and (3) Able to design learning (training) in schools and business or industry [9]. The role of Vocational High School teachers is primarily as a facilitator in making the learning atmosphere so that the process according to the learning plan is to develop student competencies. Teaching is primarily the effort of the teacher in creating conditions or regulating the right environment so that interaction occurs between students with the right environment so that interaction occurs between students and their environment, including teachers, facilities and appropriate learning media [10]. Teacher-centred learning, textbook-driven approach encouraged passive learning of discrete facts and isolated knowledge [11].

Teachers, as professional educators have skills demands in individual skills and competencies. The provision of vocational teacher education varies greatly between countries, but vocational teachers must have specific competencies to meet specified needs [12]. Carrying out the professional duties of a teacher must be skilled and knowledgeable that can be obtained through education and training at a
teacher education institution. The Big Indonesian Dictionary explains that competence is the authority (power) to determine (decide something so that it can be said that competency is also the basis in the professionalism of a teacher. Competence also has an impact on teacher performance as in research Ade Sobandi [13] shows a competency teacher influence 19.51% on teacher teaching performance, research Parhi, HA Wahab Jufri and Muntari [14], showed that competence had a significant effect on teacher performance in productive fields, and also Siti Zuhriyah's research [15], showed competence had positive influence and significant to the performance of teachers of State Vocational Tourism groups in the Special Region of Yogyakarta.

Pedagogical competence is generally defined as the ability to manage the learning of students [16]. Pedagogical competence is the ability in terms of knowledge and skills about learning. Also, Păiși Lăzărescu Mihaela defines "Psycho-pedagogic competence includes the capacity to know pupils and to take into consideration their age groups and individual characteristics in the planning and achievement of the instructive-educative activities; the capacity to communicate easily with pupils, to influence and motivate them for the learning activity and a particular discipline; the capacity to plan and achieve optimally instructive-educative activities; the capacity to evaluate instruction, programs and activities objectively, pupils' education and their successful outcomes; the capacity to prepare pupils for self-instruction and self-education"[17]. Pedagogical competence has five main components, namely 1) Capacity to find out the characteristics of students, 2) Capacity to communicate, 3) Capacity to plan and achieve learning objectives, 4) Capacity to evaluate objectively and 5) Capacity to prepare students for independent education [17]. Thus, pedagogical competence can be interpreted as the ability to manage to learn, ranging from planning, implementation to reflecting learning outcomes so that learning objectives can have an impact on learners based on knowledge and skills.

Every Vocational High School teacher is required to meet pedagogical competency standards that apply nationally in Indonesia. The pedagogical competence of Vocational High School teachers has the core competency standards set by the Government of the Republic of Indonesia in the Republic of Indonesia Minister of National Education Regulation Number 16 of 2007 concerning Academic Qualification Standards and Teacher Competencies, namely 1) Mastering students' characteristics from physical, moral, spiritual, social aspects, cultural, emotional and intellectual, 2) Mastering learning theories and principles of learning that educate, 3) Developing curricula related to the subjects/areas of development that are supported, 4) Organizing learning that educates, 5) Utilizing information and communication technology to learning interests 6) Facilitating the development of potential learners to actualise the various potentials they have, 7) Communicating effectively, empathically and politely with students, 8) Carrying out assessment and evaluation of the learning process and results, 9) Utilizing the results of assessment and evaluation to for the importance of learning and 10) Take reflective action to improve the quality of learning.

Pedagogic competency standards set by the Government of the Republic of Indonesia, in general, have covered pedagogical aspects. Principally almost the same in the aspects of pedagogical competencies established by the Government of the Republic of Indonesia [18]. There are only additional aspects of pedagogical competencies that are actively participating in academic dynamics and organisational organizations, in this case, are school education institutions.

2. Research Method
Research on the pedagogical competence of productive subject teachers at the Vocational High School in Banten Province is included in this type of quantitative descriptive research. The population of this study is the Vocational High School in Banten Province which has eight districts/cities with a total of 690 schools. The sampling technique uses purposive sampling. Schools that were sampled were 16 schools selected based on the Reference Vocational High School (SK DITP SMK Number 705/D5.2/KP/2016) in Banten Province with a total of 72 Vocational High Schools. Details of the selection of the 16 schools are two schools in every regency/city in Banten Province, namely (1) VHS 1 Rangkasbitung, (2) Setia Budhi Rangkasbitung Vocational High School, (3) VHS 1 Pandeglang, (4)
VHS 2 Pandeglang, (5) VHS 1 Kragilan, (6) VHS YP Fatahillah 1 Kramatwatu, (7) VHS 2 Tangerang Regency, (8) VHS PGRI 1 Balaraja, (9) VHS 1 Cilegon, (10) VHS YPWKS Cilegon, (11) VHS 1 Kota Serang, (12) VHS PGRI 1 Kota Serang, (13) VHS 2 Kota Tangerang, (14) VHS PGRI 1 Kota Tangerang, (15) VHS 1 Kota Tangerang Selatan and (16) VHS Sasmita Jaya 2 Tangerang Selatan. The research was conducted in 2018.

Research data were collected using a questionnaire method that was supplemented with a rating scale, observation, and interview — the teacher as a source of data to reveal how teachers perceive pedagogical competencies in productive subjects. The 16 schools found 36 experienced teachers to fill out the questionnaire.

Data analysis techniques using descriptive statistical analysis that presents; (a) frequency distribution of each variable, (b) size of central tendency (mean, median and mode) and (c) size of dispersion (standard deviation and variance). Scoring scores in a questionnaire are grouped into five categories which are theoretically based on normal distribution rules, as explained in Table 1 [19].

Table 1. Theoretical assessment of categories

| Intervals                       | Category                  |
|--------------------------------|---------------------------|
| \( Mi + 1.8 SD_i \) < \( x \) \leq \( Mi + 3 SD_i \) | Very Good / Very Important |
| \( Mi + 0.6 SD_i \) < \( x \) \leq \( Mi + 1.8 SD_i \) | Good / Important          |
| \( Mi - 0.6 SD_i \) < \( x \) \leq \( Mi + 6 SD_i \) | Not Good / Not Important  |
| \( Mi - 1.8 SD_i \) < \( x \) \leq \( Mi - 0.6 SD_i \) | Not Good / Not Important  |
| \( Mi - 3 SD_i \) < \( x \) \leq \( Mi - 1.8 SD_i \) | Very Not Good / Very Not Important |

3. Results And Discussion

3.1. Pedagogic Competence in the Learning Process

There are 33 statements in the questionnaire. The range of scores set from 33 to 165, the value of Mi is 99, and the value of SD is 22. The results of descriptive statistical analysis using Microsoft Excel software show the mean value is 137.03; the median is 137.61; the mode is 140.1; standard deviation is 14.82; variants are 219.51; the minimum value is 115; maximum value of 160; and the sum is 4933. Based on these data, the magnitude of the range \( R = 160 - 115 = 45 \); number of classes \( K = 1 + 3.3 \log 36 = 6.13 \) rounded to 6; and the length of the interval \( P = 45: 6 = 7.5 \) rounded to 8.

Table 2. Frequency distribution of pedagogical competency data for productive subject teachers in the learning process

| No. | Intervals  | Freq. | Frequency Relative | Frequency Cumulative Relative |
|-----|------------|-------|--------------------|------------------------------|
| 1   | 115-122    | 3     | 8.33%              | 8.33%                        |
| 2   | 123-130    | 7     | 19.44%             | 27.78%                       |
| 3   | 131-138    | 9     | 25%                | 52.78%                       |
| 4   | 139-146    | 11    | 30.56%             | 83.33%                       |
| 5   | 147-154    | 3     | 8.33%              | 91.67%                       |
| 6   | 155-162    | 3     | 8.33%              | 100%                         |
| Amount |       | 36    | 100%              |                              |

The average data of research results is 137.03. This value is higher than the average ideal criteria of 99 so that the pedagogical competence of productive subject teachers in the learning process, in general, is included in both categories. The trends of each score are presented in table 3.

The data in table 3 shows that the pedagogical competence of productive subject teachers in the learning process generally tends to fall into the good to the very good category. This is consistent with the average results of research that have been analysed. The total score obtained is 4933 and the highest score set is 5940, then the achievement score is 83.04% in the excellent category. The top
three sequences of pedagogical competency aspects based on empirical productive subject teachers in Banten Province are: (1) the ability to communicate effectively, empathically and politely with students, (2) the ability to organise learning that educates and (3) the ability to conduct assessments and evaluations learning process and results. While the three lowest sequences of these are: (1) the ability to take reflective actions to improve the quality of learning, (2) the ability to actively participate in academic and organisational dynamics, in this case, are educational institutions and (3) the ability to develop curriculum related to the eye lessons learned.

Table 3. Percentage of tendency scores for pedagogical competency variables for productive subjects in the learning process

| Intervals            | Category      | Frequency | %    |
|----------------------|---------------|-----------|------|
| 138.6< x ≤ 165      | Very good     | 17        | 47.22%
| 112.2< x ≤ 138.6    | Good          | 19        | 52.78%
| 85.5< x ≤ 112.2     | Poorly        | 0         | 0%
| 59.4< x ≤ 85.8      | Not good      | 0         | 0%
| 33< x ≤ 59.4        | Very bad      | 0         | 0%
| Amount               |               | 36        | 100% |

The description of the results of the study shows that the pedagogical competence of productive subject teachers in Vocational High Schools in Banten Province as a whole from 33 statement items is included in both categories. This confirms that the development process that occurred in vocational education in Banten Province has been headed in a good direction, especially for teachers. The process does not only involve many parties but the entire scope of vocational education in Banten Province is still trying to make better developments, without exception the teacher himself is obliged to increase his competence to support the task as an educator.

The highest empirical aspects obtained in this study are aspects of the ability to communicate effectively, empathically and politely with students. It is based on the condition of educators/teachers having strategies in communicating effectively, empathically and politely and the majority of teachers have the application of distinctive language to create responses and reactions of students/students. Strategies ineffective, empathic and polite communication are widely owned because the teachers themselves consider themselves to be the second parents in school after the biological parents of the students, in other words, the maturity of a teacher. The more experienced a teacher is in educating, the more communication strategies he has (in this case, the flying hours that affect it). The application of distinctive language has influence on the learning process. It is because of the many similarities in the socio-cultural background of the teacher and his students. The example is the use of regional languages or jokes, which are mainly for the delivery of learning material so that students do not get bored quickly.

The lowest empirical aspects obtained in this study are aspects of the ability to take reflective action to improve the quality of learning. It was based on the lack of the teacher's ability to use the results of reflection to improve and develop learning in the subjects being taught. That ability is what is important in this aspect. For example, in conducting classroom action research whose primary purpose is to see the reflection of the learning process, there are still many teachers who have not done so, both from public Vocational High Schools and private Vocational High Schools.

3.2. The Urgency of Pedagogical Competencies in Productive Subject Teachers

There are 33 statements in the questionnaire. The range of scores set from 33 to 165, Mi value of 99 and SDi value of 22. The results of descriptive statistical analysis using Microsoft Excel software show the mean value is 143.11; the median is 139.3; mode is 145.8; standard deviation is 9.23; a variant is 85.24; the minimum value is 123; maximum value of 165; and the sum is 5152. Based on these data, the magnitude of the range (R) = 165 - 123 = 42; number of classes (K) = 1 + 3.3 log 36 = 6.13 rounded to 6; and the length of the interval (P) = 42: 6 = 7.
Table 4. Frequency distribution of urgency data aspects of pedagogical competencies in productive subject teachers

| No | Intervals   | Frequency | Frequency Relative | Frequency Cumulative Relative |
|----|-------------|-----------|--------------------|------------------------------|
| 1  | 123-129     | 2         | 5.56%              | 5.56%                        |
| 2  | 130-136     | 8         | 22.22%             | 27.78%                       |
| 3  | 137-143     | 8         | 22.22%             | 50.00%                       |
| 4  | 144-150     | 10        | 27.78%             | 77.78%                       |
| 5  | 151-157     | 6         | 16.67%             | 94.44%                       |
| 6  | 155-162     | 3         | 5.56%              | 100%                         |
|    | Amount      | 36        |                    | 100%                         |

The mean data of the research results is 143.11. This value is higher than the average ideal criteria of 99, so the urgency of the pedagogical competence of productive subjects, in general, is very important. The trends of each score are presented in Table 5.

The data in table 5 shows that the pedagogical competence of productive subject teachers in the learning process generally tends to fall into crucial to essential categories. This is consistent with the average results of research that have been analysed. The total score obtained was 5152 and the highest score set was 5940, so the achievement score was 86.7% with a very important category. The top three sequences of pedagogical competency aspects based on empirical evidence of productive subject teachers in Banten Province are: (1) utilising information and communication technology for learning purposes, (2) mastering students' characteristics from physical, moral, spiritual, social, cultural, emotional aspects and intellectuals and (3) communicate effectively, empathically and politely with students. While the three lowest sequences of these are: (1) actively participating in academic dynamics and organisational institutions, in this case, are educational institutions, (2) facilitating the development of learners' potential to actualise the various potentials they have and (3) organising educational learning.

Table 5. Percentage of trends in variable urgency scores for pedagogical competencies in productive subject teachers

| Intervals   | Category | Frequency | %   |
|-------------|----------|-----------|-----|
| 138.6<x ≤ 165 | Very good | 25        | 69.44 |
| 112.2<x ≤ 138.6 | Good       | 11        | 30.56 |
| 85.5<x ≤ 112.2 | Poorly      | 0         | 0%   |
| 59.4<x ≤ 85.8  | Not good   | 0         | 0%   |
| 33<x ≤ 59.4    | Very bad   | 0         | 0%   |
| Amount        |           | 36        | 100% |

The description of the results of the study shows that the urgency of the pedagogical competence of productive subject teachers in the Vocational High Schools in Banten Province as a whole of the 33 statement items included in the category is significant. This confirms that pedagogical competence is still very important to be mastered by teachers and prospective teachers. This perception is based on a questionnaire answered by experienced teachers.

The first highest aspect in the urgency of the pedagogical competence of productive subject teachers is the aspect of utilising information and communication technology for the benefit of learning. The technological aspect is vital because in vocational education, it can be said that in its development, it always follows the development of science and technology. The need for information and communication is also included in this case, because quickly access is more manageable for teachers to choose and determine the material and learning experience for students. Also, aspects of information and communication technology make it easier to manage teacher administration and process student assessments.
The second highest aspect in the urgency of the pedagogical competence of productive subject teachers is the aspect of mastering the characteristics of students from physical, moral, spiritual, social, cultural, emotional and intellectual aspects. This aspect is better known as the psychological aspect of pedagogical competence in the world of education. As a Vocational High School teacher must also master the aspects of psychology without forgetting the competency aspects of the field of study because this is mandatory as an educator. In this aspect not only understand the characteristics of students but also be able to identify the potential, provision to the learning difficulties of students. The majority of Vocational High Schools in Banten Province each have a multicultural student, so as a teacher must be able to strategy in the learning process so that the delivery and get a good response from students.

The third highest aspect in the urgency of the pedagogical competence of productive subject teachers is communicating effectively, empathically and politely with students. This aspect is very applicable for prospective teachers because the majority of prospective teachers do not have experience. Lack of mastering aspects of communication also makes it challenging to deliver to students.

3.3. Teacher Perception of Productive Subjects Against Pedagogical Competence

Pedagogical competence is one of the four competencies that must be mastered by the teacher. Pedagogic competencies are unique competencies for educators. In the learning process, there are many shortcomings and shortcomings in their implementation and implementation.

There are several aspects of weaknesses or difficulties in applying pedagogical competence for Vocational High School teachers in Banten Province. These aspects are known when observing and interviewing directly with the teacher. Aspects of the difficulty of the application include optimal difficulties in subjects related to vocational/productive, difficulty in choosing learning experiences for students, difficulty in selecting material and learning resources, teacher competency that is not evenly distributed, difficulties in increasing self-competence as teachers and lack of supervision by the local government of private Vocational High Schools.

An outline of the aspects of the pedagogical competency difficulties above is the facilities and infrastructure of Vocational High Schools in Banten Province that do not match the ratio of students to learning tools/media. Besides, the lack of vocational training institutions for teachers because the perception of teachers if there are adequate vocational training institutions in Banten Province will certainly motivate teachers to upgrade their competence. In the process, productive subject teachers in Banten Province have implemented their pedagogical competencies but lacked theoretical understanding.

Difficulties are not an obstacle for productive subject teachers in Banten Province. There have been efforts or efforts that have been made by teachers to improve their pedagogical competencies including participating in training and seminars, making teacher creativity as a support for learning, discussions between teachers about various things, following the teacher's deliberations (MGMP), seeking information from the internet and discussion between groups to learn from experience.

Efforts or efforts in improving pedagogical competence that is rarely done by teachers in Banten Province are conducting classroom action research. The majority of the teachers argued for doing their class-action research constrained from understanding the manufacturing process.

The observations also resulted in the opinions of teachers in Banten Province regarding the provision of pedagogical competencies for new productive subjects or prospective teachers. According to experienced teachers' new teachers or prospective teachers must understand education in the realm of cognitive, affective and psychomotor, the selection of material and learning experiences for relevant students, understanding student characteristics, mastery of educational psychology and the deepening of methods, experiences and concepts in vocational education.

The opinions of the teachers in Banten Province also conveyed the provision of specialised pedagogical competencies for educational institutions of educational personnel (LPTK) to provide educational students or prospective teachers to deepen the field of vocational education and also the
provision of semester credit units (credits) in lectures in the field of education even more without forgetting field of study. With this, it is hoped that the increasing competence of teachers in Indonesia can become more professional.

4. Conclusion
The conclusions based on the results of data analysis and discussion are as follows. First, the results of the pedagogical competency study of productive subject teachers in Vocational High Schools in Banten Province are generally included in both categories of 33 statement items with the average research result data is 137.03 and the tendency of the score to answer well is 53%. Second, the results of the research on the urgency of the pedagogical competence of productive subject teachers in Vocational High Schools in Banten Province are generally included in the very important category of 33 statements with the average data of the research results is 143.11 and the tendency of the score of answering is very important at 69%. Third, in learning activities, there are still difficulties in applying pedagogical competencies. Efforts by teachers to improve competence and knowledge are in participating in workshops and discussions with peers to increase knowledge and knowledge.

Based on the results of this study, the researcher can provide the following suggestions. First, all aspects of pedagogical competence still need to be strengthened so that they can achieve the right level evenly in vocational education in Banten Province. Secondly, based on teachers' perceptions of the difficulties in applying pedagogical competencies and efforts to improve competence, it is expected to be used as a reference for teachers and prospective teachers.

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