

Improving Teacher Competence through Industrial Experience Practice on the Teacher Professional Education (PPG) Program to Support Industry-Based Learning in Vocational High Schools

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Abstract—This research aimed at describing the industrial experience benefits for improving the competence of Vocational High School teachers. Descriptive research methods were used to collect data from students enrolled in the Teacher Professional Education Program in 2021. The research revealed that learning in Vocational High Schools is carried out in classrooms, workshops, laboratories, studios, teaching factories, and industry. Meanwhile, the results revealed that teachers must have prior experience relevant to their professional competence for industry-based learning to be successful. This indicates there is a need to implement industry-based learning by recruiting teachers or making it mandatory for inexperienced teachers to take industrial internships. The results showed that implementing industrial internships will be immensely beneficial to teachers. For instance, internships will offer them industrial work experience, recognized competency certification, industrial standard vocational competence, learning based on real work, and cultivation of work culture through industrial learning.

Keywords—*industrial experience practice, teacher professional education program*

I. INTRODUCTION

Across the globe use the term Vocational Technology Education differently. However, the second congress held on April 26-29, 1999, with the theme Technical and Vocational Education and Training: A Vision for the Twenty-first Century, came up with the terminology of Technical and Vocational Education and Training (TVET) covering formal, non-formal, and informal education and training. This was agreed upon after a mutual agreement through a delegation attended by representatives of UNESCO, the International Labor Organization (ILO), and UNEVOC. Therefore, TVET education and training is designed to prepare the workforce according to the employment needs and demands in the business world and industry [1].

According to Billet [2], “vocations are products of individuals experiences and interests, that are, in some ways, a person dependent.constrain the human capacities required to undertake those activities”. Vocational is an interesting product or service that involves an individual experience that others can rely upon, specifically when required to accomplish a task. Moreover, vocational is related to the capacity needed to carry out a work activity according to the required measures. Therefore, to develop the vocational needs of a person require study and training called vocational education. The TVET curriculum has been designed to unleash students' full potential. This includes having job insight, expertise in technical work, employability skills, and self-transformation to the changing demands of the work sector. The development of educational, vocational learning praxis can be carried out in classrooms, workshops, laboratories, studios, teaching factories, business centers, hotels, technoparks, hospitals, clinics, agricultural fields, livestock centers, fisheries, workplace industries, business world, sports fields, community, and others [3].

Currently, the enormity of technological developments has an impact on vocational education. According to Trilling and Fadel [4], the 21st-century learning competencies include innovation skills consisting of diverse knowledge and skill mastery, critical thinking, problem-solving, communication, collaboration, creativity, and innovation. Furthermore, digital literacy, including information literacy, media literacy, and ICT, forms another aspect of competence. The other competence group encompasses life skills: flexibility and adaptability, initiative, social and cultural interaction, productivity and accountability, leadership, and responsibility.

The presence of teachers in the education sector is a significant factor that cannot be ignored. To become a teacher, one must have academic qualifications, competencies, and professional certifications. The academic qualification standard is achieved through academic studies either with a bachelor's

degree (S1) or Diploma Four (D4) per the subjects being taught. In addition, the teacher competency standards include pedagogic, personality, professional, and social competencies. Meanwhile, teacher certificates are obtained through teacher professional education [5,6]. Teachers play a significant role in formal and informal learning. Therefore, there is a need to support every effort to improve the quality of education.

Developing productive teacher competencies is one of the government's key considerations in ensuring quality learning in Vocational High Schools (SMK). According to the Regulation of the Minister of National Education Number 22 of 2006 [7], productive teachers tutor subjects grouped into Basic Skills and Expertise Competencies. Therefore, to have competent professionals, teacher training is required. The competence of vocational teachers also needs to be developed towards realizing industry-based skills for posterity.

Vocational teachers are expected to master vocational knowledge and skills, which form the essential materials in learning. The human resources (HR) in Vocational High School have a decisive role in achieving educational goals through employing qualified teachers who can effectively implement learning. According to Khan [8], the availability of quality teachers, which certainly starts from recruitment, leads to success in education. Therefore, Vocational High Schools should have enough qualified and specialized teachers.

Lack of support from stakeholders has been identified as to why Vocational High Schools cannot create a quality learning environment that fulfills the required standards. Besides, these institutions are deficient in qualified teachers, who will ensure education quality to students in line with science and technology development demands.

However, there are efforts to improve the quality of education through enhanced capacity building for professionals with S1 and Teacher Professional Education (PPG). It is deemed important to build a synergy between the two educational institutions through research on curriculum, infrastructure, human resources, and field experience programs, to produce qualified teachers with educator competencies and certifications.

Vocational High School teachers are mandated to ensure students acquire the necessary skills to become competent in their vocational fields. This implies that teachers must embrace technology and integrate it with the learning models and materials designed to fulfill future needs, trends, and predictions to achieve this objective.

The implementation of quality education must consider the modern changes in science and technology concerning the

employment structure. Teachers, the main implementers in schools, are responsible for developing their learning skills with the changing demand. Djatmiko [9] stated that current teachers are faced with demands for high standards and the provision of quality education. Therefore, teachers need to update and improve their skills through learning. According to Djatmiko [9], professional development is an opportunity for teachers to learn and help students achieve the expected competencies. This shows the need for vocational education teachers to conduct self-development to adapt to changes in carrying out their duties.

The continued shift in job demands compels teachers of vocational subjects to have competencies relevant to the development of science and technology. This needs to be supported by educational qualifications and industrial internship experience. However, it is noted that teachers are inexperienced, specifically in the production process, due to inappropriate apprenticeship programs in Vocational High Schools.

Vocational teachers must master the basic material of developing competence and implement it appropriately. Additionally, they must have sufficient experience since they are directly involved in the teaching industry. It is worthy to note that proper learning, which encompasses concepts, objectives, characteristics, and principles of vocational education, is well implemented when the teacher is experienced and has mastery of the content.

II. RESEARCH METHODS

A descriptive, evaluative method that systematically describes facts found in the field without changing each variable was used. While applying an evaluative approach, the interviewer collects respondents' views concerning the subject under study. In this research, the respondents were participants in the Vocational PPG program at the Indonesian Education University. A questionnaire was used to collect data regarding the needs in the industry. The data collected were processed by calculating the percentage for each component.

III. RESULTS AND DISCUSSION

Improving the quality of professional vocational teachers is achievable through continuous professional development in various ways, including industrial experience practice, technical competency testing, on-the-job training, being active in professional associations, continuing academic education, provision of education allowances, and financing of improvement activities [10]. The industrial experience in Vocational PPG is described in Table 1.

TABLE I. DESCRIPTION OF THE INDUSTRIAL EXPERIENCE NEEDS FOR VOCATIONAL TEACHERS

No.	Component	Level of need
1	Teachers have industry-standard vocational competencies	94
2	Teachers have technical certification from LSP/Industry	79
3	Teacher internship program in Industry	85
4	Implementation of teacher internship program in Industry	83
5	Teachers have work experience in industry	69
6	Teachers have Industrial work ethic/culture	75
7	The curriculum contains Industry-standard vocational competencies	79
8	Industry-standard curriculum alignment brings Industry	79
9	The ratio of practical tools according to industry demands	75
10	Industry standard practice room	75
11	Tool specifications according to industry standards	71
12	School collaboration with industry in fulfilling practical facilities	69
13	Learning through industry visits	88
14	Teaching factory learning	67
15	Production unit operation	63
16	Industrial class operation	58

The research finding indicated that teachers must have vocational competence according to industry standards. This can be confirmed by owning a technical certificate from the Professional Certification Institute (LSP) or Industry. Therefore, to be hired as a qualified and highly competitive teacher, every worker is expected to have a competency certificate. Since teachers have a strategic role in developing students' knowledge and skills, their competence would ensure the creation of new knowledge and useful values for students [11].

Teachers' acquisition of vocational competence can be carried out through industrial internship activities. Lucas & Spencer [12] stated that internships combined with on-the-job experience provide teachers with technical classroom training. According to Richard [13], the interaction between work and education is the core of the internship. Therefore, learning on the job provides many elements needed for proper learning, while off-the-job training enhances additional time for reflection and questioning. It also provides opportunities to understand a comprehensive learning process that can be applied in the workplace.

Dian [14] stated that the internship program is implemented in relevant institutions/industries to improve the professional competence of teachers. This is the best approach to train Vocational High School teachers to acquire real experience at workplaces and relevant industries. Internships for teachers will enable them to master the basic content and material for vocational competence.

The industrial internship program has many benefits, including providing knowledge to teachers in enhancing their competencies and sharpening their learning skills to produce competent graduates who will match the changing job demands. According to Yuniarti [15], industrial internships for vocational teachers are directly involved in industrial activities. Therefore, gaining real experience in the job market will provide insight to students on what is expected of them when they complete their studies.

Internships can lead to relevant training for vocational teacher competencies with advances in science and technology. If this program is continuously implemented, the vocational teachers will likely acquire the needed competencies. Furthermore, internships are also important in improving the competence of the teachers by enhancing their teaching skills.

Through the Directorate of Vocational Development, the government has given much attention to implementing industrial internships in producing qualified teachers. This has been made possible by holding industrial internships for 15,000 vocational teachers in 2017 assisted by the German government, both in domestic and foreign [16].

Apart from the teacher internships, which provide hands-on experience to students, other mechanisms such as the Guest Teacher method have been embraced. This method involves outsiders (not teachers) giving lessons to students according to their expertise and skills. These 'outsiders' are expected to have specific skills such as mechanical engineering or automotive repair experts conversant with automotive mechanics. Learning by utilizing Guest Teachers can be carried out in two ways. First, the resource person is asked to explain the subject matter in theory and practice in class and the school workshop. Second, the students make Industrial visits to the resource persons' workplaces under the supervision and guidance of teachers. Therefore, students can go to the Guest Teacher's place and vice versa. This method is called resource visitor [17].

Characteristics of the learning process in Vocational High Schools must be adapted to expertise programs. This can be possible through carrying out regular industrial visits with relevant stakeholders.

Industrial visits are activities carried out by schools to enhance students' knowledge about the job market. During the industrial visits, students have the opportunity to how companies operate in their areas of specialization. They are also given an overview of what to expect when they complete school. The views collected from PPG participants affirmed the importance of learning through industrial visits. For instance, vocational students and teachers can have firsthand experience regarding activities carried out in the industrial world, hence, they can stimulate and inspire enthusiasm to achieve success. Also, students and teachers learn about work expectations, which helps to improve their competence. This enables them to practice and familiarize themselves with the skills required (high attitude, behavior, and discipline).

IV. CONCLUSION

The industrial learning pattern at Vocational High Schools prioritizes preparing competency units for prospective graduates and the types of competencies in the business and the industrial worlds. Therefore, communication and partnership between the Business/Industrial World (DU/DI) and schools is crucial. Furthermore, the implementation of partnerships between Vocational High Schools, the business and industrial fraternity will lead to increased development. These partnerships include management of joint activity programs between education providers and partner institutions, utilization of infrastructure facilities owned by partnering institutions, funding programs to realize potentials that can be implemented, and placement of graduates from educational institutions into the work sector.

For industry-based learning to succeed, teachers must have experience in the relevant industry. This will be achieved by providing opportunities for teachers to perform internships, which will acquaint them with the job market needs. Conclusively, the results showed that implementing industrial internships for teachers is crucial. The benefits accrued include having work experience in the industry, ownership of a recognized certificate, adequate industrial standard vocational competence, learning based on real work, and cultivation of work culture through industrial learning.

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