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Implementation of Production Based Learning Models in the Workshop Program of Education of Building Engineering Education Sebelas Maret University

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ABSTRACT

Building Engineering Education becomes a vocational education institution that prepares competent and professional graduates in building engineering. The background of this research is from the problem of the learning process that is not in accordance with the business world and the industrial world (DUDI). Through this research to see the products in Building Engineering Education seen from the teaching factory components. The purpose of this research is to find out: (1) competence delivered, (2) completion time, (3) the product is required internally/ externally. (4) investment needs. This research uses a descriptive qualitative method. The data used is the semester learning plan, college contracts and interviews. Sampling in this study using purposive sampling technique with snowball sampling technique. Based on the research results, it concluded that: (1) the competencies that are delivered from three managerial functions, namely learning planning in the form of semester learning plans (RPS) are following the existing planning stages; implementation of learning methods used project-based learning, (2) time for completion of the product processing process is completed on time according to the college contract, (3) products needed internally / externally, preferably the type of product that is in accordance with the market, (4) investment needs can be accepted in the market or used for further practice, the proceeds from product sales are allocated for maintenance and developments of tools.

1. Introduction

Education is the main key to achieving progress, a benchmark for the quality of human resources (Suherman & Shafira, 2019). Vocational education is one of the solutions in creating superior and competent human resources so that they can compete in the business and industrial world (Maysitoh et al., 2018). Disas (2018) stated that vocational education is synonymous with learning how to work, vocational education seeks to improve individual technical competence through control of technology, education and abilities needed in the digital age as it is today so that graduates have the readiness to face the job market. and the industrial world which is currently integrated with technology (Maysitoh et al., 2018; Misbah et al., 2020).

Building Engineering Education is a vocational education institution that prepares competent graduates and prospective educators in the field of building engineering. Learning in Building Engineering Education is expected to be able to equip graduates with sufficient and professional competencies and be able to compete in the business and industrial world. The study program must be able to develop following the development of the world of work. The development of adequate higher education is stated in Law No. 20 of 2003 article 45 paragraph (1) concerning educational facilities and infrastructure, which reads: "every formal and non-formal education unit provides educational needs in accordance with the growth and development of the physical, intellectual, social, emotional, and psychological potential of students. Facilities and infrastructure are expected to achieve skilled and competent graduates to compete in the business and industrial world.

One of the efforts to improve learning development is applying a learning model to the business world and the industrial world, namely the Teaching Factory (Chryssolouris et al., 2016). The Teaching Factory learning model is a production-based learning approach in a real atmosphere to bridge the competency gap between industrial needs and school knowledge (Mursidi et al., 2020). On the other hand, the Teaching Factory model as one of the learning models aims to find a point balance between the implementation of learning with the needs of practice in modern industry. This is because students need to get a new and up-to-date curriculum to address the increasing needs of the industry in the future (Chryssolouris et al., 2016). The Teaching Factory paradigm provides a facility in the form of a reality-like situation for students to develop skills and solve various challenges in industrial practice (Rentzos et al., 2015; Mavrikios et al., 2019). The Teaching Factory has 3 (three) components, namely, the product as an introductory medium to achieve competence, the job sheet containing the sequence of materials to deliver the achievement of competence, and the block schedule as an effort to create a more effective and efficient learning situation (Sanatang, 2020).

In this study, the aspect that is reviewed is the product aspect. Product is everything that a producer can offer to be noticed, requested, sought, purchased, or consumed by the market to fulfil market needs (Sulistiyani et al., 2020). The product is an introductory competency that will be mastered by students in the learning that occurs in the classroom, especially in the Building Engineering Education study program at the time of pre-observation.

2. Methodology

The method used is qualitative research (Sugiyono, 2018). The research was conducted at the Building Engineering Education Study Program, Sebelas Maret University. The data sources used were primary data sources by conducting interviews with informants, then secondary data sources were obtained from the documentation of the implementation of observation activities. The sampling technique is nonprobability focused on purposive sampling with snowball sampling technique (Widoyoko, 2012). Data collection techniques were carried out through observation, interviews and documentation (Arikunto, 2010). The instrument validation technique uses a credibility test and a confirmability test. While the data analysis technique used is an interactive model data analysis from Miles and Huberman (Sugiyono, 2018).

3. Results and Discussion

The research results obtained from observations, interviews, and documentation are four main discussions: competencies delivered, completion time, products needed internally or externally, and investment needs.

3.1 Graduate Learning Achievement

Based on the results of interviews, the competencies delivered by practical courses in Building Engineering Education are fulfilled if, in a learning process, the specified product delivers many competency achievements. The learning planning process is quite good. The assessment technique or weights are in accordance with the Ministry of Research, Technology and Higher Education, Directorate General of Learning and Student Affairs, 2016 Directorate of Learning.

3.2 Completion Time

Completion time is a schedule planning in the learning process to achieve the targets and competencies. The implementation of the learning process for practical courses is divided into several divisions of meeting time allocated for preparation work and practical implementation. At the beginning of the meeting, there is an agenda for a briefing from the lecturer regarding the design of the product to be worked on. The briefing aims to make students understand the design that will be made so that there are no mistakes. Meanwhile, the next meeting is scheduled for practical implementation in the workshop. Based on the results of interviews on product completion times in the steel and aluminium practical courses, wood practice 1, and design and furniture practices completed on time as planned in 16 (sixteen) meetings where there is a midterm exam and a final semester exam. This is in accordance with the academic guidelines of FKIP UNS 2018/2019 chapter 1 article 29 regarding semesters and the Ministry of Research, Technology and Higher Education Directorate General of Learning and Student Affairs, Directorate of Learning 2016 regarding provisions in the implementation of learning.

3.3 Product Needed Internal or External

Building Engineering Education is one of the institutions to prepare prospective teachers in building engineering, wherein each practice aims to prepare teacher competencies who have practical teaching skills when they become teachers in Vocational High School. The selected product prioritizes the type of product needed continuously or the product currently needed in the market. The product standards used are in accordance with the business world and the industrial world. From the interview data obtained, the lecturer of Building Engineering Education is also a practitioner, a contractor, etc. One of the technology transfers in the practical learning process is the existence of lecturers who have attended seminars or attended training within the company and become practitioners and contractors. Meeting internal or external needs is an interesting thing in practice, where study programs

do not need to buy finished products but can get objects of the same quality by paying production costs and material costs. However, in terms of equipment, it must be improved so that it can support the implementation of the practice so that the market can accept the product of the practice. The role of facilities and infrastructure is to facilitate student work. The more adequate the facilities and infrastructure owned, the faster the practice process carried out by students and the more honed student skills.

3.4 Investment Needs

Determination of products made by students is offered in the first building engineering education lecturer board meeting forum. Product determination aims to make the resulting product able to be sold in the market for the development of practical needs. Not only lecturers who innovate, but students are also invited to innovate in making job sheets for practice. The study program conducts industrial visits both directly to the industry and invites the industry to learn new technologies and knowledge to produce competent students who can keep up with market developments. The results of the interview found that the proceeds from product sales were allocated for the cost of improving materials, tools, and machine maintenance. In addition, savings are made starting from practical objects that can be turned into products that are worth selling. The management of facilities and infrastructure for the Building Engineering Education workshop is managed by the head of the laboratory, assisted by a council of lecturers and laboratory assistants. Meanwhile, the maintenance of practical tools is carried out by laboratory assistants and assisted by outside technicians for machine tool calibration. The current facilities and infrastructure are good enough, laboratories and workshops have started to clean up, and the equipment has started to function optimally.

4. Conclusion

In general, the researcher concludes that implementing the production-based learning model in Building Engineering Education has been carried out well. As stated in the last section of the introduction, this study aims to review the quality of learning outcomes in terms of product aspects while implementing a project-based learning model. Based on the research that has been carried out, here are some overview of the results of this study: 1) The competencies delivered from the lesson plan are prepared in the form of a semester learning plan, the implementation of learning uses production-based learning, learning assessment with an assessment rubric, 2) The completion time of product work can be completed within 16 (sixteen) meetings according to the targeted planning stated in the lecture contract and learning schedule provided according to regulations, 3) Products needed internally or externally are prioritized on the types of products needed by market development, and 4) The need for investment in determining the product is prioritized for the product that can be accepted in the market or used for study programs. Proceeds from product sales are allocated to equipment development and maintenance.

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