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Analysis of Implementation of Apprenticeship Program in the Construction Industry

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ABSTRACT

The student apprenticeship program is part of every vocational study program's curriculum to provide practical experience in the industry. This study aims to analyze the implementation of the student apprenticeship program concerning the Kurikulum Merdeka (the newest curriculum from the Indonesian government), which provides opportunities for students to gain learning experience outside the campus. The research uses a quantitative approach with evaluative methods by analyzing context, input, process, and product aspects in the internship program implemented at the Architectural Engineering Education Study Program, Universitas Pendidikan Indonesia. The study focuses on students who interned in 6 (six) construction industries, specifically on supervisory consultants and building contractors. Data was collected by distributing questionnaires to 40 (forty) students and interviewing relevant stakeholders of the study program, supervisors, and student advisers at the company. The study results show that the apprenticeship's input and product aspects are considered excellent, which means that the study program, as the organizer is ready to implement the student apprenticeship program. However, in terms of context and process aspects, they are still considered fair. This result concerns the management and cooperation of study programs with industry which have not been optimally established. Implementing student internships in the construction industry still requires improvement, especially in program management and conformity of guidelines with industry and student needs, so that learning objectives and student experience can be in accordance with the expected learning outcomes.

Keywords: *Apprenticeship program, CIPP, Construction Industry.*

I. INTRODUCTION

The apprenticeship program is an activity that combines theoretical knowledge with actual practice on a project in the field. Experience-based learning working directly in the industry (experimental learning) equips students with job-ready skills that have the potential to increase graduates' employability [1]. The objectives of the apprenticeship program include: 1) gaining experience working in the industry; 2) understanding the attitudes and work discipline in the industry; 3) obtaining vocational competence following the competency standards demanded by the industrial world; 4) getting social competence in the form of cooperation in doing work, looking for solutions to work problems in the field [2].

The main objective of the apprenticeship program for students is to obtain work certificates in the form of industry recognition of student competence as proof of eligibility to get a job. However, most graduates at the university level show unsatisfactory results in fulfilling the competencies and knowledge that should be obtained in accordance with their areas of expertise [3]. The main problem in Indonesia's education world today is the lack of relevance of the educational's outcome quality to the demands of industrial needs [4].

The unemployment ratio in Indonesia based on data from the Central Statistics Agency (CSA) in February 2022 was recorded at 5.83% of the total working age population (208.54 million people), 14% of whom were diploma and bachelor graduates. Meanwhile, the results of a Tracer Study conducted on Architectural Engineering Education, Faculty of Technology and

Vocational Education Universitas Pendidikan Indonesia students showed that 41.51% of students still lacked skills in science while working (Tracer Study PTA, 2021).

There were several obstacles experienced during the process of implementing the apprenticeship program, including: 1) students were confused about the assignments given by the industry; 2) the theoretical knowledge gained during lectures was not in accordance with actual activities in the field; 3) students have not fully obtained some of the internship matters; 4) the implementation of the Apprenticeship program is not well-directed so that the tasks assigned are inconsistent and structured; 5) assignments given are not evenly distributed; 6) the lack of the supervisor's role so that there is no monitoring between students, supervisors, and field supervisors resulting in unclear student activities during the implementation of the apprenticeship program.

These facts prove a discrepancy between learning outcomes and fulfilling student competencies based on experience gained in the field. For this reason, an evaluation process is needed to assess the sustainability of an ongoing program. This article examines a sample of Architectural Engineering Education Faculty of Technology and Vocational Education Universitas Pendidikan Indonesia who conduct internships in the industry using the CIPP evaluation model (Context, Input, Process, Product). The purpose of evaluating with the CIPP method is to prove and improve the program through recommendations generated based on the evaluation results [5]. As a result of the evaluation program, the recommendations can be used as a basis for decision-making for stakeholders to maintain what has been implemented or improve what has not been fulfilled.

2. METHODS

This study uses a descriptive method with a quantitative approach. The sampling technique was carried out using purposive sampling, with the following criteria: 1) companies in the scope of work in supervision and implementation; 2) the company accepts many intern students; 3) the company is located or is working on a project in Bandung. Based on calculations with the formula Lemeshow, 1997, we obtained a total sample of 40 apprentices.

Data collection in this study used questionnaires, interviews, and documentation. Questionnaires are used to measure the input, process, and reinforcement aspects of the product aspect. Interviews measure context aspects, while documentation collects secondary data through final apprenticeship scores to measure product aspects. Data analysis techniques are used using descriptive statistical techniques. The questionnaire results have a score criterion calculated by percentage analysis. The calculation used as seen in formula one:

$$P = \frac{\Sigma X_1}{\Sigma Xn}\, x\, 100\%$$

P : percentage amount
Σx1 : total actual score
ΣxN : sum of ideal scores

Interpretation of the data is then carried out concerning the following qualification criteria.

Table 1. Data Descriptive Categories

Percentage Range	Category
90% - 100%	excellent
80% - 89%	Good (Suitable)
70% - 79%	Fair (Moderately suitable)
≤69%	Poor

Sumber: [8]

3. RESULTS AND DISCUSSION

3.1. Context

The context aspect is based on the basis for implementing Industrial Practices, the relevance of industrial practice programs, and forms of support for Industrial Practice programs. The survey results show the context aspect with an average sub-indicator of 70%, meaning that this aspect is in the moderately suitable or fair category. The foundation used by the study program to support the development of the Kurikulum Merdeka is the integration of work experience for students in the form of internships in industry, especially in the construction industry.

However, it is still found that the role of study programs is not optimal, especially in managing cooperation with industry. In implementing cooperation between study programs and partners/industry, it is necessary to pay attention to the following stages and procedures: 1) assessment of cooperation and analysis of potential partners; 2) study of cooperation; 3) ratification of cooperation; 4) implementation of cooperation; 5) monitoring and evaluating the implementation of cooperation; 6) program development; 7) termination, change or extension of cooperation [6]. From the results of observations and interviews, in practice, all of these stages have not been fulfilled.

3.2. Input

Assessment indicators on the input aspect include the readiness of the apprenticeship program management, the

suitability of the apprenticeship program requirements, and the suitability of the apprenticeship program preparation.

Based on the survey results, the implementation of apprenticeships in the industry on the input aspect is in the "very suitable" or excellent category with a percentage value of 96%. This result aligns with the statement that, overall, students have fulfilled the suitability of the internship practice requirements in the industry [7]. The input aspect includes management readiness, suitability of requirements, and implementation readiness, which are made in the apprenticeship implementation guidelines.

Complete and detailed project determinations have been listed in the guidelines and conveyed through socialization and debriefing to students. However, there are still constraints on the input aspect, as shown in Table 2:

Tabel 2. Constraints on the Input Aspect

No	Component	Constrain
1	Determination of construction projects	Students find it difficult when placed on projects in the construction work stage, not architectural work.
2	Determination of the number of students in one company	Students have difficulty dividing the apprenticeship program cs of discussion in the report with other group members

Source: Researcher Analysis, 2022

3.3. Process

In the CIPP model, process evaluation determines the suitability between what is planned and what is implemented [8]. In general, the evaluation process, in terms of the five indicators, shows conformity with what was planned. However, each indicator has constraints, so improvements are needed so that the apprenticeship program implementation process can run as it should align with the research results [9].

In the process aspect, supervising lecturers and managers of work practices (industry apprentices) is emphasized, including preparing manuals, student arrangements, exam schedules, monitoring, and debriefing for students. In the process aspect, the obstacle that has not been implemented optimally is the monitoring process in the industry. Guidance is carried out after students have completed practical work, which will reduce the quality of the process. Ideally, monitoring carried out by supervising lecturers includes monitoring of student competence, the progress of student knowledge, attendance, and obstacles encountered during the implementation of the apprenticeship program [10].

Supervisors and work practice managers' lack of monitoring in the industry impact learning outcomes that require students to be controlled and their competency guaranteed in carrying out apprenticeship practices. The lack of monitoring is not in line with the apprenticeship system in Germany, which has implemented digitization in the monitoring process through the Swisscom, log-in, and Post platforms [11]. The platform allows interaction between the three parties involved in the apprenticeship/industrial practice process. In practice, this application will be more effectively used in the student monitoring process because it contains information about student attendance and working hours, assessing student performance progress, and even solving problems that can be done together [11].

Apart from lecturer supervisors, another obstacle that needs to be improved is the role of field supervisors, who provide directions, monitor activities, and provide solutions to problems encountered [12]. However, the guidance in the field carried out by field supervisors did not run optimally. In contrast to the apprenticeship system in Germany, staff who serve as mentors in an apprenticeship company must meet the requirements in fulfilling social competence and pedagogical competence as supervisors [13]. In German vocational education and training, social competence is indispensable for achieving work skills and acquiring student work competence [14]. In line with the apprenticeship program [12], social guidance conducted by an expert is part of forming student competence. Pedagogic competence leads to the ability to manage the apprenticeship process in terms of communication with apprentice students.

In the process aspect, student work competence is essential to discuss [8]. Basic student readiness skills, motivation, mental and physical abilities, and self-confidence are the most influential factors in the Apprenticeship program's success [15]. In this case, the workability of students is considered to be the same as the quality of apprentices in Canada, as evidenced by the completion rate of the apprenticeship system in that country of only 9.8% [16]. This comparison shows that it is necessary to increase students' abilities in terms of knowledge and skills. The constraints field supervisors feel on student work competencies can be seen in Table 3.

Tabel 3. Constraints on Student Work Competency

No	Component	Constrain
1	Knowledge	Students are less critical in understanding construction projects
2	Knowledge	Students do not understand much about the types of materials and their designations.
3	Knowledge	Understanding material and equipment planning is not optimal
4	Skill	The ability of students to evaluate construction work is not maximized
5	Skill	The ability to analyze the calculation of the construction budget plan and schedule is lacking.

Source: Researcher Analysis, 2022

Based on the description above, in terms of the process aspect of implementing Industrial Practices, it is necessary to have a system that can be used to collect and manage data and information related to Industrial Practices. With technological advances, website-based information systems are deemed appropriate to be developed. The system is used to collect, process and distribute information related to partner companies, facilitate the process of guidance and monitoring, report collection, assessment, and other matters relating to Industrial Practices. This information system can later be a reference source and database for students in the next Apprenticeship Program. The website-based work practice information system is easily accessible using a browser without having to install an application or root so that parties involved with industrial practice activities are facilitated by the presence of the web [17]. A website-based monitoring application can simplify the apprentice control process so that it becomes more efficient and effective; there is an archive of apprentice data in digital form, and the apprenticeship process becomes more flexible because apprentices do not have to meet face-to-face with the supervisor [18].

3.4. Product

Evaluation of product aspects aims to ensure that program objectives are achieved [5]. Based on the scores obtained by students above the evaluation on the product aspect, it is included in the appropriate category. The value listed on the Study Result Card (SRC) shows an average score of 3.69 GPA. The Apprenticeship Program assessment refers to the five principles of the National Higher Education Standards (SNPT), which consist of educative, authentic, objective, accountable, and transparent. In line with these assessment principles, the aspects assessed in implementing the Apprenticeship program include reports, exams, and the field. The assessment comes from industry and study programs. However, industry assessments that give positive and effective values are not in line with the research results on the process aspect, and there are several complaints made by field supervisors about student work competence. This is very likely to happen if it is supported by a statement from the field supervisor, which states that, in practice, the assessment is carried out by the company's engineers so that the impression given by the industry is positive. The absence of monitoring by the supervisor on activity reports that should be carried out within one week reinforces that the assessment given is not following the actual achievement of student competence. Student daily activity reports can reveal student learning achievements. Which competencies have been carried out or have not been carried out or competencies that the industry does not provide to students while carrying out the Apprenticeship program [11].

Tabel 4. The accumulation of the result Product aspect

NO	Indicators	Score	Percentage	Category
1	Achievement of the objectives and functions of the apprenticeship program	1193	84%	Suitable
2	Achievement of Learning Outcomes	961	79%	Fair (Moderately suitable)
Total		2154	81%	Suitable

Source: Researcher Analysis, 2022

Based on the description above, ensuring the assessment is under students' actual conditions and competencies is necessary. As stated in the Independent Learning Guidebook of the Kampus Merdeka which states that the main focus of the independent learning program is learning outcomes [19]. The achievement of

learning outcomes for Architectural Engineering Education students is quite appropriate, and some sub-indicators are considered inappropriate in solving construction problems. This is not in line with the vocational education and training system in Germany, where social competence is seen as indispensable for achieving work skills and acquiring work competence. Social skills in question include (the ability to communicate and cooperate, the ability to solve problems rationally, and the ability to manage attitudes towards work) [14].

4. CONCLUSION

Based on the results of the research and discussion regarding the evaluation of the implementation of the Apprenticeship program in the Architectural Engineering Education study program, it can be concluded as follows:

1. The implementation of industrial practice (internship in the construction industry) in the Architectural Engineering Education study program in terms of the context aspect is included in the moderately suitable or fair category. The basis for implementing the Apprenticeship program is under the governing legislation. The objectives of industrial practice align with the study program's vision and mission. The study program and industry have provided good support, but the cooperation between the two has not been established intensively.
2. The implementation of industrial practice (internship in the construction industry) in the input aspect is included in the very Suitable or excellent category. The study program is considered to be ready to manage the actions that need to be prepared in managing the apprenticeship program. The mechanism for submitting industrial practice places complies with the regulations listed in the Industrial Practice Manual so that the required administration is fully fulfilled.
3. The implementation of industrial practice (internship in the construction industry) in the process aspect is included in the appropriate category. Judging from the role of supporting lecturers, there is still a lack of distribution of supervisors and scheduling of apprenticeship program seminars. Monitoring carried out by supervising lecturers on students has not been carried out intensively. Giving assignments by field supervisors to students does not run systematically. And the fulfillment of student work competencies is not optimal, especially in mastering material and work skills, so the process of implementing the apprenticeship program is not in accordance with what has been regulated in the guidebook.
4. The implementation of industrial practice (internship in the construction industry) in terms of the product aspect is included in the appropriate category. This is based on the average final score obtained by students in the excellent category. However, from the questionnaire results, student learning outcomes have not been in accordance with the study program learning achievement targets, especially regarding student social skills in solving construction problems.

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