

Internship Experiences:

Contribution to the Shop Drawing Reading Skills

Arris Maulana*, M. Agphin Ramadhan, Haura Mahaliandini

Faculty of Engineering
 Universitas Negeri Jakarta
 Jakarta, Indonesia

*arrismaulana@unj.ac.id, agphin@unj.ac.id, mahaliandinihm@gmail.com

Abstract—This study aims to determine the effect of internship program on the ability to read shop drawing. This research is a quantitative study with a correlational research design. The study population were 78 students of the Bachelor Program of Vocational Education in Building Construction, Universitas Negeri Jakarta which carried out the Professional Placement course in 2019-2020. Meanwhile, the sample in this study were 61 students taken from the population using a purposive sampling technique. Data were collected from tests using question instruments and documentation of student learning outcomes. The results show that professional placement had a positive and significant effect on the ability to read shop drawing as indicated by the correlation coefficient value = 0.293, the significance coefficient value = 0.022, and the coefficient of determination = 0.086 which means that 8.6% of internship program affected the shop drawing reading skills.

Keywords—*internship program, shop drawing, reading skills*

I. INTRODUCTION

The construction industry is an industry that requires a large number of skilled workers. The skills of the workforce in the construction sector will determine the quality of the project. Hussain et al. said that project performance is based on the skills of the labors during the execution of the project, in which their skills and abilities can affect the project's progress to a greater or lesser extent. These skills need to be taught earlier during lectures to make Civil Engineering students graduate ready with the required skills [1]. Creasey stated employability has three components, namely: a good degree, generic skills, and a set of personal attributes. Universities can provide learning experiences related to the world of the construction industry, one of which is an internship program for civil engineering students [2]. Guler and Mert declares that the civil engineering students are keen to participate in practical training programs during their period of education and that civil engineering departments should update the theoretical courses taking into consideration the practical applications [3]. According to Karji, internships have been shown to be impactful tools to connect students' learning in academia with real-world industrial needs [4].

Internship experience will influence career choices. Yamamoto emphasizes that students who take programs in a field of work will have the desire to be employed in that field once they have graduated [5]. According to Odio, internship is a critical period for students transitioning into the workforce and a significant source of the industry's future workforce [6]. Anjum said that internship programs have an impact on the professional growth and skills of the students. Relation to the field of civil engineering, internship experience indicates that the internship program is an effective pedagogical approach for experiential learning for foundation and concrete work course. However, internships do not always provide good skills for Engineering students [7]. Zehr found that students did not look for connections between the classroom and the workplace, making it difficult to apply skills from one setting to the other. Therefore, it can be concluded that the success of the internship program is influenced by supervisors at work, work environment, job descriptions, and supervisors on campus [8].

In the world of the construction industry, drawings are important in carrying out work. Chedi explained that technical drawing/graphic is a medium of communication among technologist, engineers, architectures, technicians, etc. and is widely used in many fields and professions [9]. Shop drawings are drawings, diagrams, schedules, and other data specially prepared for the work by the contractor or a subcontractor, manufacturer, supplier, or distributor to illustrate some portions of the work [10]. Shop drawing is the technical process that contractor details the drawings according to concept design drawings and submit to the consultant company [11]. It can be concluded that a shop drawing or a working drawing is a technical field drawing that is used as a reference for the implementation of a job. These pictures are detailed, and they serve as guidelines for the implementer or contractor in carrying out the work of a project.

In carrying out an internship in the world of construction, the skill to be trained is the ability to read shop drawing. Thus, the students are able to understand the structural, architectural, or MEP work that is being done. Gao et al. concluded that to improve drawing readability in the construction industry includes 1) using colored drawings, 2) improving design details, 3) reviewing drawings and specifications for

consistency, and 4) using more 3D modeling techniques. It is important to understand shop drawings during an internship so that when students graduate they are trained to read shop drawings [12]. Kosse and Senadeera, said that the abilities to produce, read, and correctly interpret engineering documentation (including drawings) are critical to the work of professional engineers [13].

Students of the Building Construction Vocational Education Undergraduate Program at Jakarta State University can do an internship after attending lectures for 5 semesters or having taken 100 credits. During the internship, students are asked to observe iron and casting work on beams, columns, and plates. In this observation activity, students compare what happens in the field with what is in the shop drawing. The ability to understand shop drawing will be needed when they graduate. This is related to the profile of student graduates as teachers in Vocational High Schools in the field of building engineering expertise and employees in the construction services sector. This study aims to determine the effect of internships on the ability to read shop drawings in undergraduate students of Vocational Education in Building Construction at the Jakarta State University.

II. METHOD

This research was conducted in Vocational Education in Building Construction study program, Faculty of Engineering, Jakarta State University and was carried out from March 2020 to July 2020 using a quantitative approach with a correlational research design and ex post facto methods. Total samples in this study were 61 students of class 2016 S1 Vocational Education in Building Construction study program who have carried out practical work on construction projects and were taken using purposive sampling technique, other data is the result of the value of the Professional Placement course. The technique of collecting data on the dependent variable is the ability to read shop drawing using a test in the form of multiple choice questions, while the independent variable is internship using documentation techniques by obtaining data from the administration of the Vocational Education in Building Construction study program. The data obtained were then analyzed using data descriptions, analysis prerequisite tests and hypothesis testing.

III. RESULTS AND DISCUSSION

Based on the data obtained from 61 students, it shows that the internship program variable (X) has the highest score with a weight of A which is converted into a score of 5 and the lowest score with a weight of B + which is divided into a score of 3 from the lowest possible score, i.e. 1. The score obtained a mean value of 4.38, median of 4, mode of 4, and a standard deviation of 0.582. In the trend category, it can be seen an overview of the conditions of internship program of students in the Vocational Education in Building Construction study program that 42.62% of students were in the very high score category, 52.46% of students were in the high category, 4.92% of students were in the high enough category, while 0% of

students were in the low or very low category. Once the average of the incoming data was obtained, the internship program variable was in the "Very High" category with a mean score of 4.38.

The variability of the ability to read shop drawing of students in the Vocational Education in Building Construction study program at the State University of Jakarta was measured through a test instrument. It provided multiple choice with a total of 40 items and was distributed to 61 respondents. In this variable, data of scores obtained were converted from the type of interval data to categorical data. In the interval data, the highest score was 97.5 and the lowest score was 45. After they were converted into categorical data, the highest score was 5 and the lowest score was 1. Then, these scores were analyzed using IBM SPSS Statistics version 20 software, obtaining a mean value of 3.36, median of 3, mode of 4, and a standard deviation of 0.753. Based on the trend category, it can be seen that from the description of the ability to read pictures of students in the Building Engineering Education study program, Jakarta State University, 4.92% of students were in the very high score category, 42.2% of students were in the high category, 37.71% of students were in the high enough category, 13.11 of students were in the low category, and 1.64% of students were in the very low category. Once the average of the incoming data was obtained, the variable reading ability was in the high category with an average score of 3.36.

In this study, all data collected from research instruments were tested for normality using the IBM SPSS Statistics version 20 software with the One Sample Kolmogrov-Sminnov Test method. The results of the analysis of the normality test show that the data is normally distributed with a significant value (Asymp. Sig. (2-tailed)) of 0.161, indicating a significance value was greater than 0.05. Based on the results of the homogeneity test using the IBM SPSS Statistics version 20 software, it is known that the significance value was 0.068, meaning it was greater than 0.05 and the results of the research data have the same variant value.

From the results of the analysis using simple regression, the correlation coefficient value was 0.293, which was positive. Thus, it can be seen that Internship Program (X) had a positive effect on Image Reading Shop Drawing (Y).

TABLE I. COEFFICIENT

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|-------|-------|----------|-------------------|----------------------------|
| 1 | 0.293 | 0.086 | 0.070 | 0.727 |

Furthermore, the test results obtained a significance coefficient value of 0.022, meaning less than 0.05. Thus, it can be concluded that the internship program variable influenced the shop drawing reading ability variable.

The coefficient of determination on internship program (X) on the ability to read shop drawing (Y) was 0.086. This means

that the variable X had an effect on variable Y with 8.6% and the rest was influenced by other variables that were not studied, such as personality factors, social cognitive factors, environmental factors, and individual conditions.

TABLE II. SIMPLE REGRESSION COEFFICIENTS

| Model | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|------------------|-----------------------------|------------|---------------------------|-------|-------|
| | B | Std. Error | Beta | | |
| Constant | 1.702 | 0.711 | 0.293 | 2.392 | 0.020 |
| Internship Score | 0.379 | 0.161 | | 2.352 | 0.022 |

Table II shows the constant coefficient (a) was 1.702, while the coefficient of the independent variable, namely internship program (b) was 0.379, the regression equation was expressed as $Y = 1.702 + 0.379X$. This equation shows that the regression coefficient was positive, so it can be said that the direction of the influence of the variable X on Y was positive. Based on the significance value from the simple regression coefficient table, it obtained a significance value of $0.022 < 0.05$; so it can be concluded that the internship program variable (X) affected the shop drawing reading ability variable (Y). Meanwhile, based on the t value, it is known that t_{count} value was $2.352 > t_{table}$ of 2.001. Thus, it can be concluded that the internship program variable (X) affected the shop drawing reading ability variable (Y).

Furthermore, Triyono et al. concluded that the students' employability skills for construction drawing engineering were categorized as good with a low discrepancy of 25.82% according to the industrial perspective and 20.81% according to the students' perspective. Specially, the skill in reading shop drawing obtained from the apprenticeship program can be further improved by paying attention to several rules [14]. According to Marsono et al., to improve the competence of the internship program, industries and school should give the students opportunity to finish their job with more than one supervisor [15].

Tener said that quality internships enable students to "learn how to learn" in ways that are highly applicable in their future work environments, and that are not otherwise attainable in classroom learning [16]. Silva and Teixeira said that internship experiences influence the development of career adaptability, especially in the dimensions of curiosity and confidence. Internships greatly affect the skills of Civil Engineering students. If the students merely rely on learning in class, their skills are not in accordance with the skills needed by the construction industry [17]. According to Oroh et al., if the teaching materials given have not been maximized in accordance with the needs of productive skills required construction services industry, the results have an impact on the low absorption of graduates in the implementation of the construction services industry [18]. Kurniawati said that industrial internship program is very much needed by students of the Building Construction Vocational Education

Undergraduate Program, so that they are ready to face the world of industry/work after graduation. In this case, work readiness is a very good indicator after participating in an industrial internship program [19]. Based on the discussion and research results above, it can be seen that the practice of fieldwork carried out by students of the Building Construction Vocational Education Undergraduate Program at the State University of Jakarta has an effect on the ability to read students' drawings. Therefore, the implementation of effective and efficient field work practices will certainly affect students' ability to read shop drawing.

IV. CONCLUSION

The results of data analysis show that internship program had a positive and significant effect on the ability to read shop drawing of students in the Vocational Education in Building Construction study program, Jakarta State University. This can be seen from the correlation value of 0.293, the coefficient of determination of 0.086, and t_{count} (2.352) $>$ t_{table} (2.001). Based on the determination coefficient of 0.086, it means that 8.6% of the ability to read shop drawing were influenced by internship program, while the rest was influenced by other factors which were not discussed in this study.

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