Perspective student’s internship on development of technology in the industry

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Abstract. The internship program is given to introduce the world of work to students before graduating from school. Many things are obtained by students during internships, especially those related to skills development. School technology is different from industrial technology. They need to adjust to these differences. This research was conducted in the 11th grade students of Machining engineering as many as 46 students in the 2018/2019 school year. Internship students are spread across 24 manufacturing and service companies in Bekasi Regency. The questionnaire uses Google Forms to facilitate data collection. The research objective is to understand the development of technology in the industry according to the perception of the internship students. In addition, the suitability of student competencies is also checked. The results showed that Mechanical Engineering students were placed more in the "maintenance" section compared to other types of work. The Department of Mechanical Engineering is still needed in the industrial world. However, competencies learned in schools with industry are not appropriate.

1. Introduction

Lack of collaboration between vocational education institutions and the industrial world causes a gap between the two [1]. Educational institutions are not accustomed to mature management principles, whereas the industrial world lacks experience and knowledge about the field of education [2]. This has an impact on the absorption of vocational high school (SMK) graduates in the world of work [3]. Industry is asked to provide maximum access for students to do an internship [4]. This activity can give students actual work experience. In addition, the issue of the industrial revolution 4.0 is being discussed in this country. Artificial intelligence is developed to solve problems and enhance human imagination for a better life [5].

Vocational High Schools (SMK) are formal vocational secondary education institutions in Indonesia. The aim of vocational education is to produce students who have the knowledge, attitudes, and skills needed by graduate users [6]. SMK must be able to produce competent graduates in accordance with the needs of graduate users [4]. Innovation needs to be created to improve quality and solve various social problems [7]. Innovations can be created by professional teachers. Professional teachers can improve student learning achievement [8]. The increase certainly has an impact on increasing student competence in facing the times.
The internship program is a solution to introduce students to the real world of work. Students experience firsthand how the culture of industry. The difference in technology in schools and industries becomes knowledge for them. They need to adjust to these differences. But during an internship, it is not easy for teachers to check the progress of student competencies [9]. Industry feedback is needed to determine student performance during the Industrial internship period [10]. Thus, cooperation between the two has an important role as a determinant in improving and developing the competitiveness of human resources [11].

2. Methods
This study aims to determine the development of technology in the industry from the perspective of the internship students. Data was taken from the entire population of 11th grade Mechanical Engineering students in 2018/2019 who carried out internships with 46 respondents. Internship students are spread across 24 manufacturing and service companies in Bekasi Regency. Data collection using a questionnaire consisting of 10 question items. In the process, data collection is assisted using Google forms which make data processing easier.

3. Results and discussion
3.1. Implementation of internet
The implementation of the internship lasts for one school year. The duration of the internship time undertaken by students is divided into three categories. The general data regarding the duration of student internship time can be seen in Table 1.

| Duration of Time | Respondent | %   |
|-----------------|------------|-----|
| < 3 months      | 1          | 2,2 |
| 3 - 6 months    | 35         | 76,1|
| > 6 months      | 10         | 21,7|

The duration of the internship is determined based on an agreement between the school and the industrial world. The industry submits application for student internships to the school through the Industrial Relations Division, then passes on to the department to determine candidates according to the required criteria. The duration of the first stage of the internship is three months. Furthermore, the company submits an extension of the internship period to the school if the students have good attitudes and expertise according to the needs of the company.

3.2. Industrial classification of internships
The classification of apprentice industries is grouped into four categories based on the number of employees, namely home industries, small industries, medium industries, and large industries. The industry classification of internship students based on the number of workers in the company, is generally explained in Table 2.

| Number of employees | Respondent | %    |
|---------------------|------------|------|
| < 4 person          | 0          | 0    |
| 5 - 19 person       | 5          | 10,9 |
| 20 - 99 person      | 14         | 30,4 |
| > 100 person        | 27         | 58,7 |

The data above shows that most students carry out apprenticeship activities in companies with a large category that have more than 100 employees. This certainly has a positive value for the development of
the ability of apprentice students to learn how to work in large companies. Other industrial classifications are based on the sector of work, namely the manufacturing industry and the service industry. Research data shows that as many as 67.4 percent of respondents carry out internships in the manufacturing industry, the remaining 32.6 percent in the service industry. Data was obtained from 24 companies located in industrial estates in Bekasi Regency.

3.3. Technological developments in the industrial

Technological developments in the industry are very rapid. The era of automation is one of the mainstays being developed by companies today. The expected goal is the creation of quality results in a faster processing time. Alignment of the learning and linking curriculum between educational institutions and the industrial world is needed. Cooperation between the world of education and industry has an effective impact on the development of apprentices. Learning factory activities are concepts that have been carried out as evidence of collaboration between educational and industrial institutions. This can plague the gap that has occurred so far between the world of education and industry [12].

The research data shows that the suitability between fields of expertise and industry needs is at the percentage of 52.2 percent, as described in Table 3 below. Interesting things can be seen in Table 4, the suitability between the types of work and majors when conducting an internship. There were 16 respondents who stated that the work carried out during the internship was not in accordance with the department in the school. The data only differed by one number from respondents who stated that the work carried out during the internship was very suitable.

| Table 3. Compatibility of departments with industrial needs. |
|-----------------|-----------------|-----------|
| Category        | Respondent      | %         |
| very suitable   | 11              | 23,9      |
| Suitable        | 24              | 52,2      |
| Not Suitable    | 8               | 17,4      |
| Very Not Suitable | 3             | 6,5       |

| Table 4. Types of work with departments. |
|-----------------|-----------------|-----------|
| Category        | Respondent      | %         |
| Very suitable   | 17              | 37        |
| Suitable        | 8               | 17,4      |
| Not Suitable    | 16              | 34,8      |
| Very Not Suitable | 5             | 10,9      |

Seeing this phenomenon, Fig 1 can explain what type of work the respondent did during the internship. As many as 43.5 percent of respondents worked as Maintenance Staff during internships. Only 8.7 percent of respondents work as production and welding machine operators, which are in accordance with teaching materials in schools.
The data above certainly requires an in-depth analysis of the types of work respondents do during an industry internship. An expertise that is needed is needed in the face of the current industrial era 4.0 [13]. Thus, it is necessary to harmonize capabilities learned in schools with the needs of the industrial world [2]. Issues regarding the era of Industry 4.0 in the industry where respondents are apprenticed are quite talked about by employees. The data in Table 5 shows the results of the discussion on the Industrial Industry era.

### Table 5. Issues on the industrial revolution in industry.

| Category            | Respondent | %     |
|---------------------|------------|-------|
| Often Discuss       | 17         | 17,4  |
| Ever Discussed      | 8          | 30,4  |
| Rarely Discuss      | 16         | 28,3  |
| Never Discussed     | 5          | 23,9  |

3.4. **Benefits for internship participants**

The benefits obtained by respondents during an internship in the industry are certainly not small. Many things were obtained during the 3-6 month period in the industry. Work ethics, discipline, quality and quality, as well as other industrial cultures become more value for respondents to work when they graduate from school.

### Table 6. Benefits of technology development.

| Category   | Respondent | %     |
|------------|------------|-------|
| Very get   | 17         | 37    |
| Get        | 27         | 58,7  |
| Get Less   | 2          | 4,3   |
| Do Not Get | 0          | 0     |

The data in Table 6 shows that after internships in industry, respondents benefited from technological developments in the industrial world. Regarding the improvements that must be made by the school as a place of learning for the interns, Fig 2 explains that as many as 67.4 percent of respondents answered...
that material about engineering needs to be lived in to deal with technological developments in their place of internship.

![Improvement of Learning Materials](image)

**Figure 2.** Improvement of learning materials.

4. Conclusion

Vocational High Schools need to make a change effort to improve the competencies of their graduates. Through internships, schools can find out about technological developments in this industry. Apprentices can directly feel the development of the industry, especially in the application of technology in carrying out their production processes. Apprentices can feel their shortcomings when doing internships. Technical lessons become something that needs to be improved during the learning process at school. The need for alignment between things learned in schools with industry needs.

References

[1] Khan M A 2019 International Journal of Hospitality Management A systematic assessment of gaps between academic research and industry participation in hospitality management discipline *Int J Hosp Manag* 82 pp 82–90

[2] Baumann T, Harfst S, Swanger A, Saganski G and Cell A 2014 Developing competency-based, industry-driven manufacturing education in the USA: bringing together industry, government and education sectors *Procedia - Soc Behav Sci* 119 pp 30–39

[3] Indonesia K K 2019 *Statistik* 41 pp 1–16

[4] Inpres No 9 2016 *Tentang Revitalisasi SMK Dalam Rangka Peningkatan Kualitas dan Daya Saing Sumber Daya Manusia Indonesia* Instruksi Presiden Republik Indonesia

[5] Deutscher V and Winther E 2017 Instructional sensitivity in vocational education *Learn Instr*

[6] Polat Z, Uzmanno S, Çevik N, Ö Ç, Tekta N and Oral B 2010 Internship education analysis of vocational school students *2 Procedia - Soc Behav Sci* 34 pp 3452–3456

[7] Lee S M and Trimi S 2016 Journal of Innovation Conceptual paper Innovation for creating a smart future *Suma Negocios* 1–10

[8] Bakar R 2018 Kasetsart Journal of Social Sciences The influence of professional teachers on Padang vocational school students’ achievement *Kasetsart J Soc Sci* 1–6

[9] Shin Y, Lee K, Ahn J and Jung J 2013 Development of Internship & Capstone Design Integrated Program for University-Industry Collaboration *Procedia - Soc Behav Sci* 102 pp 386–391

[10] Ahmad N and Shariff S M 2013 Students’ Practicum Performance of Industrial Internship Program *Procedia - Soc Behav Sci* 90 pp 513–521
[11] Gazizova A and Khuzina E 2015 Academic-Industry Partnership in Russia and Abroad 214 pp 941–945

[12] Moldavska A and Abreu-peralta J V 2016 Learning factories for the operationalization of sustainability assessment tools for manufacturing: bridging the gap between academia and industry Procedia CIRP 54 pp 95–100

[13] Perignat E and Katz-buonincontro J 2018 STEAM in Practice and Research: An Integrative Literature Review Think Ski Creat