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Analysis of Graduates' Soft Skills of Vocational High School Majoring in Software Engineering Skill Competence in Startup Industry

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Abstract

Facing the 4.0 industrial revolution, the graduates of Vocational High School (SMK) majoring in Software Engineering need to equip themselves to elevate their competence. Hard skills should be balanced with soft skills to compete globally, particularly in the startup industry. Facts revealed that the vocational high school graduates majoring in software engineering had not met the expectations of the startup industry, which put a more substantial concern on soft skills. This study aimed to reveal the soft skills required by the startups that vocational high school graduates majoring in software engineering need to acquire. The result of this study showed that the need for soft skills among vocational high school graduates majoring in software engineering who worked in the startup industry still needed to be improved, covering several aspects in the following: (1) critical thinking and problem-solving skills; (2) active communication skill both spoken and written; and (3) emotional quotient. It can be implied from the result that attempts are needed to increase the soft skills of vocational high school graduates majoring in software engineering to compete globally and fulfill the needs of the startup industry. The attempts should be a substantial concern among the policy maker as an institution determining the national curriculum to support the skill improvement of hard and soft skills. On the other hand, the stakeholders of Vocational High Schools need to advance the collaboration with the industrial world to equip the graduate candidates majoring in software engineering to quickly meet the needs of the labor market in the startup industry.

Keywords: software engineering; skill competence; startup industry

Abstrak

Menghadapi revolusi industri 4.0, lulusan Sekolah Menengah Kejuruan (SMK) jurusan Rekayasa Perangkat Lunak perlu membekali diri untuk meningkatkan kompetensinya. Hard skill harus diimbangi dengan soft skill untuk bersaing secara global, khususnya di industri startup. Fakta menunjukkan bahwa lulusan SMK jurusan rekayasa perangkat lunak belum memenuhi ekspektasi industri startup yang lebih mementingkan soft skill. Penelitian ini bertujuan untuk mengungkap soft skill yang dibutuhkan oleh startup yang perlu dimiliki oleh lulusan sekolah menengah kejuruan jurusan rekayasa perangkat lunak. Hasil penelitian menunjukkan bahwa kebutuhan soft skill pada lulusan SMK jurusan rekayasa perangkat lunak yang bekerja di industri startup masih perlu ditingkatkan, meliputi beberapa aspek sebagai berikut: (1) kemampuan berpikir kritis dan pemecahan masalah; (2) keterampilan komunikasi aktif baik lisan maupun tulisan; dan (3) kecerdasan emosional. Dari hasil tersebut dapat tersirat bahwa diperlukan upaya untuk meningkatkan soft skill lulusan SMK jurusan rekayasa perangkat lunak agar dapat bersaing secara global dan memenuhi kebutuhan industri startup. Upaya tersebut patut menjadi perhatian besar di kalangan pengambil kebijakan sebagai lembaga penentu kurikulum nasional untuk mendukung peningkatan keterampilan hard skill dan soft skill. Di sisi lain, pemangku kepentingan SMK perlu memajukan kerjasama dengan dunia industri untuk membekali calon lulusan jurusan rekayasa perangkat lunak agar dapat segera memenuhi kebutuhan pasar kerja di industri startup.

Kata kunci: rekayasa perangkat lunak; kompetensi keterampilan; industri startup

1. Introduction

The development of the industrial revolution 4.0 provides significant opportunities for increasing the digital industry. The number of creative and digital industries increases the number of jobs in the information and communication technology sector. The implication is the availability of the number of jobs in this field is also growing. This is an opportunity and a challenge, especially for the workforce with vocational secondary education graduates. The Central Statistics Agency noted an increase in IP-TIK, especially in East Java Province, with an increase from 4.27 in 2016 to 4.88 in 2017 with a high ICT Development Index category of more than 4.49 [1]. This increase indicates the development of the creative digital industry, which directly impacts the demand for labor needs in this field.

The availability of employment for vocational high school graduates in the Software Engineering program is relatively high. This is due to the increasing trend of startup companies, especially in the East Java Province, especially Malang City. According to the MIKTI Database, there are 110 startups in Malang, both large and small [2]. This is evidenced by the existence of East Java's economic income of up to Rp. 170.96 trillion by startups that are categorized as being included in the scope of the creative economy in 2017 [3].

The startup industry is considering hiring vocational high school graduates majoring in Software Engineering (SMK RPL) for their companies. Like the startup companies Ezy Industry and Illiyin Studio, they already have several workers from SMK RPL graduates. The high demand for graduates of the Software Engineering skill competency workforce indicates that there are many employment opportunities in the field, especially in the information and communication technology industry. It's just that there are still gaps related to the recruitment of vocational high school graduates, especially in the competence of software engineering expertise in soft skills competencies that are not following what is expected by the startup industry.

The problem of the soft skills gap is a weakness of vocational high school (SMK) graduates who are generally absorbed in the industry. The startup industry's expectations for vocational high school graduates in software engineering are very high regarding hard and soft skills [4]. The world of the information technology industry considers that the company's success is not only based on hard skills but is also balanced on soft skills with a more significant portion. The reason is that soft skills are competencies about how someone can complete their work and are used to support someone in completing their work [5]. This will impact success and quality in working more efficiently and productively. The importance of soft skills needs that need attention and the inequality that occurs in the field make the purpose of this research to know better and reveal what the startup industry needs related to the soft skills of vocational high school graduates in the field of Software Engineering.

1.1. Soft Skills

Soft skills are fundamental abilities, especially in the era of disruption. Wagner states that it requires seven skills that individuals must master to survive in the 21st century: critical thinking and problem-solving [6]. Critical thinking and problem-solving are needed in the startup industry to make judgments based on information and communication obtained using reflective reasoning and sufficient evidence to support research [7]. Meanwhile, critical thinking skills are expected to solve problems appropriately and effectively.

Communication skills have also become one of the most needed in the world of work and have been widely discussed in scientific studies. One of the importance of communication skills in work is that it can increase self-efficacy or self-confidence that people can work well [8]. This skill becomes the primary means of working because it relates to other people. Not only verbally but also in writing.

According to a survey by LinkedIn, a soft skill that has recently entered is emotional intelligence [9]. Emotional intelligence is a combination of self-awareness, self-regulation, social skills, empathy, and motivation or skills to recognize personal and other people's emotions as a means for productive thinking and behavior at work [10]. Emotional intelligence can be interpreted as the ability of an individual to recognize their self.

1.2. Vocational High School in Software Engineering

A vocational high school graduate in Software Engineering is an expert in information and communication technology at the level of vocational secondary education. The goal of competence in the field of Software Engineering is to equip students with the skills, knowledge, and attitudes to be competent to work professionally in the business and industrial world as middle-level workers. [11]. It means that graduates of vocational high schools in the field of Software Engineering are prepared to enter the industry, one of which is the startup industry, which is equipped with three areas of competence, namely knowledge, attitude, and skills competencies to work optimally. These competence domains must be integrated into a single unit that cannot be separated.

1.3. Startup

A startup is a company that emerges when there are more and more internet users, especially since the rapid development of digital and the industrial revolution 4.0, which has changed the direction of economic activity in the world community, including Indonesia. A startup is an institution, and it can be an individual or a company that sells new products or services that were established under very uncertain conditions with reasonably high risk [12]. A startup can also be said to be a startup company identical to a business that uses technology, the web, the internet, or everything related to the internet of things [13]. A startup is also said to be a company founded by individuals or organizations to sell new products and services by utilizing digital technology in conditions full of uncertainty but designed to generate maximum profits.

The Characteristics of startups are : (1) the age of the company is less than three years, meaning that it is still in the early stages of a digital company; (2) the number of employees is less than 20 people at the beginning there were only a handful of people; (3) income is less than $100,000/year, not much profit because it still costs to develop the company; (4) is engaged in technology, the use of applications, for example; (5) products made in the form of digital form applications or internet of things; (6) operate through websites or social media that still use IoT [14].

2. Methods

This study uses a descriptive qualitative approach to analyze and reveal in depth the soft skills needs of graduates of vocational high schools in the field of software engineering in the startup industry in Malang City. The qualitative approach was chosen because descriptive

research with a qualitative approach is generally carried out in case studies by focusing on a particular unit of various phenomena so that it is in-depth in the research objectives [15].

3. Result and Discussion

The data obtained in the field results from the in-depth interview method. Interviews were conducted with three informants: the Chief Operating Officer of MejaKita, the Founder of Algostudio, and the Human Resources Department of Venturo. The three informants are described in the following table.

Table 1. Research Informants Description

No	Informants	Startup Business Field
1	COO MejaKita	Platform and Mobile Apps in education
2	Founder Algostudio	Genera Digital Agency
3	Human Resources Staff Venturo	digital agency and IT Consultant

Table 2. Code of Research Informants

No	Informants	Code
1	Founder Algostudio	AS
2	COO and Co-Founder of MejaKita	MK
3	Human Resources Staff Venturo	V

The research was conducted with a qualitative approach. Therefore, the researcher conducted in-depth interviews with three selected informants to obtain the necessary data. The results of the interviews with the three informants are shown in Table 3.

Table 3. Results of Interviews

Soft Skills	MK	AS	V
Critical Thinking and Problem Solving	“They are less able to analyze. They have not been able to anticipate the details that the client might find difficult or dissatisfied with the project, or the client has a different perspective from them.”	“If they are given the wrong task or job, they rarely protest, so they do it as it is. They don't think about the consequences elsewhere; if the instructions are wrong, they will continue doing it. It still must be dictated as well."	"They are very lacking. Their mindset is immature. They have not been able to contribute to solving the problem. Tend to be passive.”
Communication both Spoken and Written	“Not good at the beginning of work, but by demanding every day to be better, so are the skills to report assignments through written media. Substantive effective communication must be. Because we work as a team, yes, all team	“There is no problem with verbal communication with teammates, senior leads, or me. They already understand and can interpret for work. There is no written report that they are required to do, but in my opinion, writing skills are not	“Most of their communication is still not active, especially when they started working here. Not interactive yet. For example, expressing an opinion is not directly so. There is even a 'labor strike' attitude that they don't want to convey,

Soft Skills	MK	AS	V
	members must communicate well, how to express opinions, problems, and ideas."	even for vocational high school graduates. Even undergraduate graduates are not necessarily qualified to be given the task of making documentation."	especially after suggestions or criticisms from seniors. As for writing, because there is no special task there, it cannot measure their abilities."
Emotional Quotient	"They are quite obedient. For the soft skills needed, in the future, MejaKita will be concerned with the ability to recognize themselves or self-efficacy because that is to show their sense of optimism with the work they will do here. Apart from that, communication is also important."	"They often come late when we work in the house or the office. There was once a conflict with a senior lead because of a late deadline, and I almost fired them. They don't take the job seriously. But finally, given the opportunity for evaluation and could be better.	"Not until there is a conflict. Because they are passive, there might be a little grumbling, but understandably, they are still young. Some even haven't graduated from school."

From the results of interviews with the three informants, there are still obstacles to the ability to think critically and solve problems for graduates, such as not being good enough at analyzing issues, being passive, needing additional guidance and training, and not contributing enough to work. Critical thinking and problem-solving skills in the startup industry will affect work effectiveness. This is because thinking critically and solving problems will benefit the work process, such as conceptualizing, analyzing, and applying all the information obtained by observing, experiencing, and logically making decisions [16].

Communication skills are still a concern for startups. Based on the interviews, communication barriers in software engineering vocational high school graduates are passive without initiative and must be dictated to do work. Meanwhile, report writing skills or written writing skills have not been seen in every software engineering vocational high school graduate working in the startup industry because they are not responsible for writing technical reports or minutes. If there is a written report found only at the startup MejaKita, graduates of software engineering vocational high schools need to provide daily information regarding the scope of their work. However, some startups still hope that there will be an increase in communication skills so that work is more efficient. In the future, it will significantly help the careers of software engineering vocational high school graduates. Communication skills are still one of the 21st-century skills that occupy the most needed positions alongside collaboration [17]. This indicates that the world of business and industry still has high hopes for the need for communication skills in vocational high school graduates.

Soft skills gaps in emotional intelligence include the self-esteem that software engineering vocational high school graduates do not have for their jobs. The importance of self-efficacy for software engineering vocational high school graduates working in the startup industry and the lack of maturity of those who work in the startup industry. All of these sub-indicators lead to indicators of emotional intelligence. Overcoming emotions is an essential need for both HR (human resources) and employees because it can increase commitment to the company,

productivity, and efficiency, retain the best talent and motivate employees to give their best [18]. So it becomes crucial to have emotional intelligence skills to work in the startup industry because it directly affects the environment, interactions between colleagues, and the dynamics of IT work that is very fast and dynamic.

4. Conclusion

Soft skills include critical thinking, problem-solving, and being active in practical verbal and written communication. Emotional intelligence is essential for the startup industry because it is very influential in working effectively and efficiently, positioning oneself, and actively contributing to and supporting startup success. So it is necessary to increase the soft skills of prospective vocational high school graduates, especially in the field of Software Engineering, to compete and face dynamic global challenges in this era of disruptive innovation.

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