Digital psychology test with socio-technical system as an unemployment solution

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Abstract. Unemployment is a problem that is still hotly discussed. The problem of unemployment is very important because it has the potential to cause crime, social, political turmoil and poverty. One potential unemployment is from vocational education graduates. The cause of unemployment for vocational education graduates is the incompatibility of interest in vocational education graduates with job vacancies. This study tries to offer a solution with a socio-technical system approach. This research is focused on obtaining digital platform design in seeing the suitability of job seekers' interests with their personalities. In other words, it connects Goal - People - Technology. The development of this system is done using the Flutter framework. The results obtained are a digital psychology test platform design, which is also cross-platform, in accordance with the concept of socio-technical systems. This platform can be used to minimize the interests of vocational education graduates with jobs.

1. Introduction

Unemployment is an issue that is still hotly discussed. Unemployment itself is interpreted as a condition where someone who belongs to the labour force wants to get a job but has not been able to get it [1-3]. The problem of unemployment is very important to note because unemployment is very likely to lead to vulnerability to various crimes and social, political and poverty turmoil [4,5].

Work Employment and Social Outlook Trend recorded the number of unemployed in 2019 as 187 million people. They predicted the number of unemployed people globally in 2020 is expected to reach 190.3 million with an additional increase of 3.3 million (see figure 1) [6]. Almost the same as the conditions experienced by western countries, Indonesia is also predicted to experience the same thing. Unemployment is also still a challenge and even tends to be a threat.

Vocational education is an institution part of the government that is given responsibility in responding to the challenge of unemployment. The problem of unemployment should not occur in Vocational Education graduates. Vocational Education emphasizes the preparation of students to enter the world of work armed with the skills gained from the learning process [7]. However, the reality is that unemployment coming from vocational education graduates is still high. Referring to the results of the Central Statistics Agency (BPS) survey as of August 2019, the highest open unemployment rate
(TPT) was SMK graduates by 10.42%. High school graduates (SMA) reached 7.92%, followed by diploma graduates 5.99%, Universities 5.67% and Junior High Schools (SMP) 4.75% [8].

Various studies have been conducted to find out the causes of unemployment, especially from vocational education graduates. Some of these causes include: the number of jobs is not sufficient to accommodate the number of job seekers [9,10], the mismatch between learning done in vocational education with the needs of the workforce [3], both related to curriculum, facilities and equipment. Next is the existence of miss-interest in vocational education graduates with the job vacancy.

![Graph of global unemployment figures from Work Employment and Social Outlook Trend.](image)

**Figure 1.** Graph of global unemployment figures from Work Employment and Social Outlook Trend.

This research is part of dissertation research that develops a digital platform as an effort to prepare vocational education graduates to reduce educated unemployment. This research offers one solution to minimize unemployment in the context of miss-interest. We are done with the socio-technical system approach. Socio-technical is the view that a work process cannot be seen as two separate things consisting of technical systems and social systems, both of which must be seen as unity [11]. Thus, Socio-technical Theory is a way of looking at organizations that emphasize the interrelationships of the technical and social dimensions [12,13]. According to the socio-technical system perspective, the causes of educated unemployment are explained in six components of the socio-technical system. That is; Targets, Processes, People, Infrastructure, Culture, and Technology [14]. The six components are then decomposed into risk attributes, which can be seen in Figure 2 [15].

Based on Figure 2, it can be explained that the solution that can be handled by the platform (internal) is Goal: includes building active roles of entrepreneurs, lecturers and communities to create work partners and workers. People: include school equations, get entrepreneurship, internship and employment training. Technology: includes building a digital platform to bring together entrepreneurs, lecturers, communities and training participants. External factors that cannot be carried out by the platform but must be supported by regulations are Processes / Procedures: covering the government makes policies so that agriculture and plantations are passionate. The government limits industrial growth in rural areas. Buildings / Infrastructure: includes infrastructure improvement of transportation, communication and vocational training services. Culture: includes building the love for agriculture and plantations and modernizing agricultural and plantation technology [16].
Based on this, the research is focused on obtaining a digital platform design in seeing the suitability of job seekers' interests with their personality. In other words, we are connecting Goal - People - Technology. Personality tests are carried out using the inventory method [17,18]. Personality tests are carried out by giving questions to objects (humans) and in these questions have their values, questions are given and answers answered by objects will be able to find out some characteristics of the object [19].

2. Material and methods

This study designed a digital platform to see the suitability of interest with the personal skills of job seekers. Specifically, personality tests can be included in one branch of artificial intelligence, the expert system. In this problem, solving the problem can be done by building a system that can act as a psychologist. In other words, the information processing is done heuristically, which means building and operating a knowledge base from an expert to a computer system.

The design phase of the personality test expert system:

- Knowledgebase design is the representation of knowledge from one or several psychologists who are needed to understand, formulate and solve problems. In this case, it is used to solve problems that occur on the computer. This knowledgebase consists of two basic elements, namely facts and rules.
- The inference engine is the brain of an expert system that contains the mechanism of thinking functions and patterns of system reasoning used by an expert. This mechanism analyzes a particular problem and then looks for the best solution or conclusion.
- Working Memory is a repository of facts that are known from the results of answering questions.
- User / developer interface. The process of developing an expert system interface is used to facilitate use.

In general, system design can be seen in Figure 3. The development of this system is done using the Flutter framework. Flutter is an application development framework developed by Google. Flutter is a UI Toolkit for developing mobile, web and desktop applications, natively with only one codebase. Some other advantages of Flutter are fast development, expressive and flexible UI and native performance. In other words, this application development will produce cross-platform applications, can be used on mobile, web and desktop [20-23].
Figure 3. Designing a personality test expert system.

3. Results and discussion

Following the design stage, a knowledge base has been created using data from two psychologists who work at pre-service service bureaus. This data is needed to understand, formulate and solve problems entered in the system. Personality test indicators use the Myers-Briggs Type Indicator (MBTI) [24]. It is a psychological test designed to measure a person's psychological preferences in seeing the world and making decisions. These psychological tests are designed to measure an individual's intelligence, talents,
and personality type. This test is also used to determine the personality traits of company employees so that they can be placed in fields that make the potential of the employee optimal [25,26]. In this MBTI test, there are 4 dimensions to the tendency of human nature:

- Concentration dimensions: Introvert (I) vs. Extrovert (E)
- Dimension of understanding information from outside: Sensing (S) vs. Intuition (N)
- Dimensions of drawing conclusions & decisions: Thinking (T) vs. Feeling (F)
- Lifestyle dimensions: Judging (J) vs. Perceiving (P)

Likewise with the inference engine and working memory processes. In designing the user/developer interface, Data Flow Diagrams (DFD) have been made in the design of expert personality test systems, as shown in Figure 4.

4. Conclusion
The design of digital psychology tests using the socio-technical system approach can be used to reduce unemployment resulting from a missed interest in job seekers. This digital psychology test design is also cross-platform, under of the socio-technical system concept.

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