Interests Scale Based Online Application to Determining Major in University

Aniq Hudiyah Bil Haq1*, Dewi Kamaratih1, Gema Lara Fahmi1, Eka Malada1 and Yogiek Indra Kurniawan2

1Department of Psychology, Universitas Muhammadiyah Kalimantan Timur
2Department of Informatics Engineering, Informatics of Universitas Jendral Soedirman

*ahbh186@umkt.ac.id

Abstract. Students who graduate from high school when entering college will definitely choose a course that suits their interests and expertise, but this sometimes makes many students confused. The choice of certain majors is often based on encouragement from parents, friends and the environment. Factors related to internal students regarding personality profiles and typologies of work are rarely a consideration for students in choosing majors in college. This is because identifying interests that are in accordance with personal circumstances requires psychological measuring devices or often referred to as psychological testing. The aims of this study to identify self interest student for majoring in programs study. The tool to identification is using online-based applications. Psychology that used paper and pencil is now using a computer application, so the results of this scale can be made recommendations for students who want to major in college. This compiled application is processed automatically so that it can give results quickly and accurately. The subjects in this study were 127 students who answered their questions in this application and assessed the appropriateness of this application in terms of convenience, the language used, whether there were terms understood and whether the results were as expected by students. 70.1% of students answered that this application was easy to understand and run. 96% of students answered this application using good language and 34% of students thought that there were some terms that were not understood and also 63% of students answered that the results of this application were in accordance with their personal circumstances. The implication of this research is the psychological testing can be used by computerize administration; instruction will be easier for the tester and the result from the testing faster. Hopefully this application can be used for the student in majoring a program study.

Keyword: Online application, Interest Test, Department

1. Introduction
Changes in the current era that lead to the Industrial Revolution 4.0 based on the Cyber Physical System, where the system is related to a combination of three domains, namely digital, physical, and biological. Characterized by the emergence of functions of artificial intelligence (artificial intelligence), mobile supercomputing, intelligent robots, self-driving cars, and neuro-technological brain enhancements. Human work is even more facilitated by technological sophistication. Man's
maturity and attitude change because of technological developments, but the task of human development remains the same.

Every human being has the task of their respective development, no exception for a student who is entering the stage to plan his career in the future. Career planning is carried out by students, one of which is planning the area of expertise to be taken by choosing the type of school to study program. Identification of career specialization starts from childhood, this is called vocational development, which is a process that occurs continuously along with individual self-development, this is in accordance with the Super career theory, in career theory it is said that since childhood an individual has identified work- work that is around it. Vocational development in individuals has stages and developmental tasks. The stages of career development according to Super starts at the growth stage, namely at the age of 0-14 years, the second stage is the exploration stage at the age of 15-24 years and at the formation stage occurs at the age of 25-44 years, while the last stage is the maintenance stage at the age 45-64 years [1], [2].

The task of vocational development in students entering adolescence is to plan a career by choosing secondary school. The selection of secondary schools is based on the interests of individuals who have formed due to interactions with the environment, along with the process of vocational development, students explore the structure of work that is the center of attention, thus forming vocational behavior. Vocational behavior includes carrying out activities that lead to work that is of interest, such as honing skills, choosing appropriate programs and seeking as much information about the work as they do [3]–[5].

Theory about vocational much also discussed by Holland which suggests that the concept of interest as the basis of the formation of one's personality. This theory also emphasizes the personal competencies possessed by someone, educational behavior (educational behavior), and the characteristics of interests, so these three things form the type of vocational personality. According to this theory there are six types of personality, namely: Realistic Type, Investigative Type, Artistic Type, Social Type, The Enterprising Type, and Conventional Type. In addition there are 6 environmental models (a model environment) where each environment is dominated by certain personality types and each environment has a description of physical conditions, problems and provides certain opportunities and opportunities, namely: The Realistic Environment, The Investigative Environment, The Artistic Environment, The Enterprising Environment, The Social Environment, The Conventional Environment. Vocational Personality Type according to Holland becomes the basis for developing a scale in identifying the interests of tertiary study programs.

Previous research Kumaidi, et al [6] conducted a study of the development of interest measuring devices based on Holland's theory. In this study produced a measuring instrument of interest which is a modification of the SDS (Self Directed Scale) which is named the Vocational Interest Scale. SDS (Self Directed Scale) is a standardized scale used to explore career choices in someone who is widely used in various countries. This study produced 228 question items consisting of questions related to the subject's activities, competencies, abilities or skills possessed the type of work desired and the ability of each subject to several types of work. This research focuses on the selection of interests to enter vocational high schools, so the context of the typology is the expertise package available at the vocational high school, so there is a need for another study that identifies students' interests in the selection of study programs in higher education.

This research is the development of previous studies using Holland's theory as an indicator of interest identification [6]. To identifying majority the program study by using an online-based application. The online application makes it easy for students to respond the question items. The advantage of collecting data using an application is in terms of ease of use or testing. The advantage of collecting
data using an application is in terms of ease of use or testing. The advantages of collecting data using an application is in terms of ease of use or testing [7].

Computer based applications can be used in helping all aspect of life [8], [9], not only in technology itself. In this era, computer based applications can be implemented in physics, multimedia, learning process at school, etc. Computer based application make life be easier because its characteristic. In addition, application can minimize the occurrence of error, both in data input, processing and reports [10].

The procedure for using this interest application is the instructions presented through a computer program. After the test process by students, the results also do not need to be corrected and presented by an expert psychological test interpretation manually because the computer program performs scoring and data processing tasks to present interest test results in the form of graphic data, scores and conclusions about the results of student interest tests. This makes the interest test process very time-efficient and scoring results carried out by computer programs are considered to be more accurate because they avoid human errors.

2. Methodology
This research begins with the preparation of measuring instruments in identifying the interests of study programs in tertiary institutions. Measuring instruments of interest use indicators in vocational personality in Holland (1997). As many as 126 students filled in the question items on the scale and also at the end of the test students were asked to fill out an evaluation regarding the use of this application which is divided into several questions including ease of use of the application, the language used in this application, are there terms understood and whether the results are as expected by students.

Methods and methodology taken in completing this activity can be shown by Figure 1 as follows:

![Figure 1. Methodology](image)

The details of each action step in Figure 1 can be explained as follows:
Construction of the scale
In this step, the researcher arrange the scale into 228 item of the question following the indicator of Holland theory about the interest scale.

Construction of the Application
In this step, a website-based interest scale app that applies the concept and theory of existing interest-scale instruments. Application of Interests Scale based on this website built using PHP programming language and MySQL database with the concept of Relational Database. This application will be placed on the internet host server, so it can be accessed by users anywhere and anytime, provided that the user is connected to the internet. Placement of applications on the internet host server makes the application can be used unlimited by tools that must be located in a certain place.

Application Simulation and Testing
In this step, the team of researcher looking for the subject who fulfill the question from the scale. The admin made a username and password for the subject. The subject is a graduate senior high school student in many school in Samarinda, East Kalimantan, Indonesia.

Evaluation from the subject
The student who was to be a respondent in the end of the test filled the questioner from the researcher. There are 4 question about the scale.

3. Results and Analysis
The Interest scale Application is built on a website based platform so it can be accessed by anyone and anywhere. Display on the website is made using HTML5 and CSS3 with responsive design, so that this application can be opened using a variety of devices, such as PCs, Laptops, Tablets and Mobile Phones. This website-based vocational interest scale application was built using the PHP programming language and MySQL database with the concept of Relational Database. This application is placed on an internet host server, so it can be accessed by users wherever and whenever, as long as the user is connected to the internet. Placement of applications on the internet host server makes the application can be used without limitation by tools that must be located in a certain place.

This application contains 228 question items consisting of questions about the subject's activities, subject competencies, abilities or skills processed, the type of work desired and the ability of each subject to some types of work. And categorized based on 6 personality types namely: The Realistic Type, The Investigative Type, The Artistic Type, The Social Type, The Enterprising Type, and Conventional Type based on the highest score.

The instrument of measuring majoring interest in university usually used a paper and pencil test or manual test so it takes a relatively longer time compared to using computer applications. Presentation Paper and Pencil test requires a tester to guide scale work, whereas with subject computer applications directly guided by computer programs so that the test implementation does not require guidance from a tester from beginning to end as well as more time efficient. In addition to needing a tester to guide the course of the test, the processing of data on a manual test takes a relatively long time and allows the occurrence of errors due to human error factor, especially at the time of input research data, it related to many research that application online makes people more effective and eficience [11]–[13].

The use of interest scale based online applications to explore student interests takes a relatively short time compared to the manual and paper-scaling scale (paper and pencil test). The process of presenting and working on a conventional scale of interest takes approximately 45 minutes, whereas the
application duration required to work on a 226 aitem scale is about 15-25 minutes depending on the speed of the subject responding to the item. The part of Scale separated into 4 part of Instruction, it can be seen in Figure 2. After the process of scaling by the subject, the next step is the process of input and data processing to be able to find the typology of student interest. The process of input data using manual methods with the help of Microsoft Excel program and then processed in the form of a web spider diagram to see the pattern. Manually input data process allows error, so the processed score becomes invalid for a lot of data.

The use of interest scale applications can minimize the occurrence of errors in the data input process because the data of the test results subject directly displayed in the form of scores and spiderweb patterns by application, it can be seen in Figure 3. So in addition to efficient use of vocational application test applications can also provide more accurate results and relatively fast.

![Image of Instruction in the application](image1.png)

**Figure. 2. Display of Instruction in the application.**

![Image of Spider web result](image2.png)

**Figure. 3 Spider web the result of Interest application.**

Applications of majoring interests are also more practical and accessible from anywhere, so there is no need for tools such as book tools and answer sheets to carry out tests. This makes the procurement of
interest tests not costly to duplicate the answer sheets and books, and any schools that have registered as users can independently test their students' interest. In addition, user data or subjects who have conducted interest tests may be collected on one server, and the data can be the norm data source for each skill pack. That way the validation process can be done continuously along with the increasing number of application users.

Majoring interest apps can be accessed using a variety of media such as PCs, tablets and even mobile phones that are connected to the internet connection due to their online nature. This facilitates the test execution process every time and anywhere. Schools can conduct the interest test process independently by studying the user manual of the application, so the interest test process does not require experts from the field of psychology.

From the evaluation from the 127 subject a student 70.1% of students answered that this application was easy to understand and run. 96% of students answered this application using good language and 34.6% of students thought that there were some terms that were not understood and also 63% of students answered that the results of this application were in accordance with their personal circumstances. It can be seen in table 1.

| No | Question                                                                 | Yes | Maybe | No  |
|----|---------------------------------------------------------------------------|-----|-------|-----|
| 1. | This application was easy to understand                                   | 70,1| 26    | 3,9 |
| 2. | This application using good language                                      | 96  | 2,4   | 1,6 |
| 3. | This application have some terms that were not understood                 | 34,6| 48    | 17,3|
| 4. | The results of this application were in accordance with subject personal circumstances | 63  | 33,1  | 3,9 |

The evaluation from the subject of this research shows that most of the subjects have a good response for the application. They think this application was easy to understand and easy to operated, and the language used in the interest scale application is good even through there are some terms that were not understand. And the most important is the results of this application were in accordance with subject personal circumstances so this interest scale based on the online application can be used to determining the major or studies program in university, the student who still confuse to take one major can use this application to get a recommendation what the right major for his or her self. The interest scale based on online application can be used for everybody who needs it. The test using application automatically makes the research or stakeholder who need the assessment in majoring interest get convenient, it same as many research that the using application based website for administrating data have many advantages for many people [11], [14].

The developing of the research still need to conduct, especially to identify the typology of the interest in majoring to university because we need to adaptation in Indonesian people personality and vocational personality also. This application can be used for the student in majoring a program studying in university.

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