

DEVELOPING MOBILE APPLICATIONS TO HELP HIGH SCHOOL STUDENTS TO CHOOSE COLLEGE MAJORS

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Abstract

Purpose of Study: The research aims to produce a mobile-based system for decision making to choose majors for high school students.

Methodology: This type of research is development research using the Lee & Owens model and is validated by media experts and counseling teachers.

Main findings: This research resulted in a mobile application that combines three types of psychological tests, namely multiple intelligence, Riasec, and personality types, to facilitate students in determining their majors. The application has been validated by media experts and counseling guidance teachers.

Application of this study: The resulting mobile application can be used by counseling guidance teachers in grade XII high schools who are still having difficulty in determining college majors. Product trials were conducted at Wachid Hasjim High School Class XII with a research sample of 40 people.

Novelty/originality of this study: This application can speed up decision making and can be used to determine college majors.

Keywords: Mobile Application, Decision Support System, Self-management Inventory, Riasec, Multiple Intelligence.

INTRODUCTION

Choosing a major is essential for high school students. The problem often is that students do not know about their interests and talents. This problem makes it difficult for students to determine the direction and specialization in the future. The lack of information about further study is also the reason students have difficulty in determining the further study. In the end, students follow their parents' choices or follow their friends' choices. In the end, students do not like the chosen field and always feel they have been wrong in choosing majors. (Fatmasari & Supriyatna, 2019)

Counseling teachers often experience this problem. For that, the counseling teacher conducts guidance by conducting majors tests. The major's test is an instrument used to assess individual interests in a variety of activities, one of which is related to the selection of majors. The most commonly used test is RIASEC based on Holland's theory, which was developed to measure individual interests based on six types of personality, namely Realistic, Investigative, Artistic, Social, Enterprising, and Conventional. (Fridayanti et al., 2018)

In high school, the RIASEC test is still not widely used and still uses paper-based tests that require a long time. However, the RIASEC test has been widely used in vocational schools, as conducted by (Hidajat, 2016), (Kumaidi et al., 2017), and (Süerdem, 2016). The use of the RIASEC test obtains significant results in terms of validity and reliability (Meireles, 2015) for career selection (Nauta, 2012) and the selection of talented students' interests (Dierks et al., 2016). In addition to using the RIASEC test, a test that is often used is Multiple Intelligence tests from Howard Gardner to determine the type of intelligence (Maftoon & Sarem, 2012) and a VAK test (visual, auditory, and kinesthetic) to determine learning styles. (Siregar, 2018)

With the development of mobile applications in Southeast Asia, which has increased in education (Murphy et al., 2017), of course, mobile-based majors test applications are urgently needed by high school students to help choose majors (Sodowsky et al., 1994; Vardarli et al., 2017). Based on the above background, then the purpose of this study is to combine the RIASEC test, the multiple intelligence test and the learning style test into a mobile application JURUSANKU that will able to help high school students to choose a major whose meets the standards of measuring instruments include the validity and reliability (Taconis & Kessels, 2009).



Figure 1: Concept of JURUSANKU Mobile Application Test

LITERATURE REVIEW

RIASEC

One personality test that is widely known is Holland's Personality Test (Walsh, et al., 2013). According to John Holland's theory, most people belong to one of six personality types. By knowing the most dominant personality types, we can predict what kind of career and work environment will make him comfortable later. Through several questions that have been carefully arranged but in random order, the results will show their personality type. Holland believes that the best way to identify career areas that might suit us is to analyze jobs related to our personality characteristics and match them to various types of work environments. Holland put forward 6 different categories that can describe the relationship between personality characteristics and work environment. (Gupta, et al., 2008; Wetzel & Hell, 2014)

The following is the understanding of each character: Realistic (R), Investigative (I), Artistic (A), Social (S), Enterprising (E), and Conventional (C) (De Fruyt & Mervielde, 1997; Ambiel et al., 2018). People with realistic types have practical ways of thinking, honest, and not wordy. People with investigative types are excellent observers and like to look for solutions to problems. People with artistic types are someone who likes creative activities, such as art creation, writing, film production, and role-playing. People with social types are more interested in interpersonal relationships between group members, friendly, understanding, and cooperative. People with enterprising types tend to like activities to persuade others to achieve goals, ambitious, brave, and confident. People with conventional types like organized activities, Accuracy, and detail, can be trusted in administrative, organizational, and numerical work. (Kurniawan, 2017)

Multiple Intelligence

Multiple intelligence can be interpreted as a person's ability to solve a problem. Intelligence includes the power of thought and cognitive development. Howard Gardner pioneered is a psychologist and education expert. (Carter, 2009; Nurlina, 2018)

The types of intelligence are: (1) Linguistic intelligence is the ability to organize thoughts clearly and be able to express them through words such as speaking, reading, or writing. (2) Logical-mathematical intelligence is the ability to handle numbers and calculations, as well as logical and scientific thinking patterns. (3) Visual intelligence is the ability to see an object in detail. (4) Musical intelligence is the ability to develop, express music, rhythm, tone, and sound. (5) Kinesthetic intelligence is the ability to combine physical and mental movements to produce perfect movements. (6) Interpersonal intelligence is the ability to understand and understand others. (7) Intrapersonal intelligence is an ability related to self-knowledge and being responsible for one's own life. (8) Naturalist intelligence is the ability to understand the natural environment well, the ability to understand and enjoy nature and recognize various types of flora and fauna, and other natural phenomena. (9) Spiritual intelligence is the ability to feel a person's variety or variety. (Gardner, 2006; Gardner, 2011)

VAK

VAK is a learning model that optimizes the three modalities of learning, namely seeing, hearing, and moving. Learning with this model emphasizes direct learning experiences and is fun for students. Direct learning experience by seeing (Visualization), listening (Auditory), and motion (Kinesthetic). (Höffler et al., 2019; Setiawan & Alimah 2019)

The characteristics of students with a visual learning style are: (1) neat and organized, (2) babbling, (3) usually not bothered by noise, (4) remembering what is seen rather than what is heard, (5) prefers reading rather than reading, (6) fast and persevering readers, (7) often know what to say, but are not good at choosing words, (8) remember visual associations, (9) have problems remembering verbal instructions unless written, and often ask people to help them repeat them, (10) be careful of details. (Deporter & Hernacki, 1992)

The characteristics of students with auditory learning styles are as follows: (1) talking to yourself while working, (2) easily distracted by noise, (3) like to read aloud and listen, (4) find it challenging to write, but great at telling stories, (5) learning by listening and remembering what was discussed rather than being seen, (6) likes to talk, likes to discuss and explain something at length. (Deporter & Hernacki, 1992)

The characteristics of students with kinesthetic learning styles are: (1) speaking slowly, (2) it is challenging to remember maps unless he has been there, (3) memorizing by walking and seeing, (4) using fingers as a guide when reading, (5) not can sit still for a long time, (6) the possibility is poorly written, (7) always physically oriented and move a lot, (8) want to do everything. So, kinesthetic children tend to remember information by carrying out their learning activities. (Deporter & Hernacki, 1992)

METHOD

The method used to develop mobile applications uses the Borg & Gall model (Gall et al., 2006). This model consists of 10 development steps: (1) research and information gathering; (2) planning; (3) develop product preliminary form; (4) preliminary field tests; (5) major product revisions; (6) main field tests; (7) revision of operational product; (8)

operational field tests; (9) revision of the final product; and (10) dissemination and distribution (Wiyono & Kholidya, 2018).

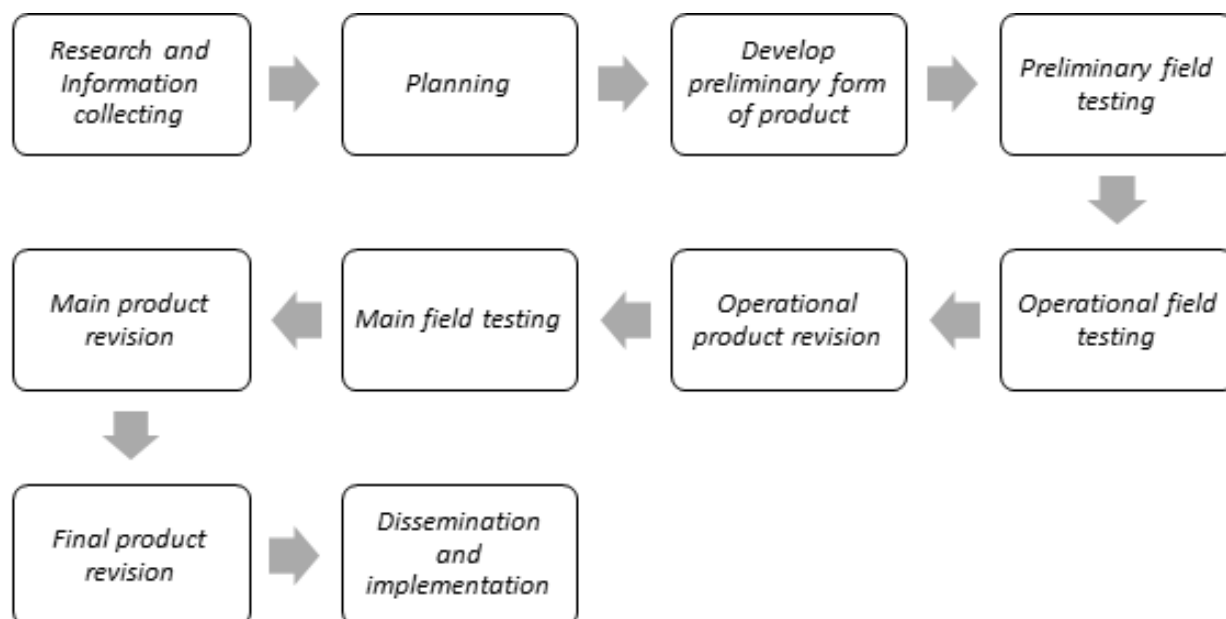


Figure 2: Borg and Gall Model

JURUSANKU involves the validation of media experts and counseling teachers who are competent in his field and field trials to 40 high school students Wachid Hasjim Lamongan.

The assessment questionnaire uses a scale of 1-5 numbers with the provision that a value of 1 means that it is not very good/very inappropriate/very inappropriate, value 2 means it is not good/not quite right/not appropriate, value 3 means good enough/quite right/quite appropriate, a 4 value is good /right/appropriate, and a value of 5 means very good/very appropriate/very appropriate.

To process data from media experts, counseling teachers, and field tests, the following formula is used to determine the validity and effectiveness.

$$P = \frac{\sum X}{\sum Xi} \times 100\% \quad (1)$$

Explanation:

P = percentage

$\sum X$ = total respondent's answer in one item

$\sum Xi$ = total ideal answer in one item

100 = constant

After the percentage collected from the overall data processing, it is included in the product eligibility criteria, which were also adapted from Arikunto (Arikunto, 2019). The explanation of product eligibility criteria is explained in the following table.

Table 1: Product Validity Criteria

Percentage	Qualification	Follow-up
85%-100%	Very Valid	Implementation
75%-84%	Valid	Implementation
56%-74%	Fairly Valid	Revision
<55%	Invalid	Revision

RESULTS

Mobile Application Platform

JURUSANKU is a mobile test application that combines learning style tests, multiple intelligence tests, and Riasec tests to help high school students to choose majors. This application consists of 3 tests, namely: (1) Learning style test,

consisting of 25 questions with five answer choices each; (2) Multiple intelligence test, consisting of 40 questions with four answer choices each; and (3) Riasec test, which consists of 7 questions in order of priority scale from 1-6.

The results of the tests from the three types of tests above will be processed and made a decision-making system to determine the choice of majors and personality of high school students.

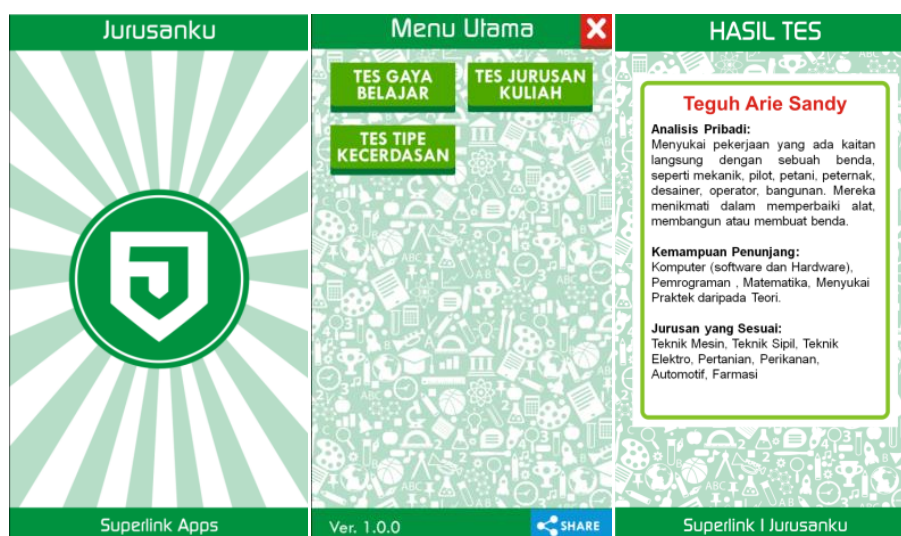


Figure 3: JURUSANKU Application

While the framework of JURUSANKU in terms of the back-end is as follows:

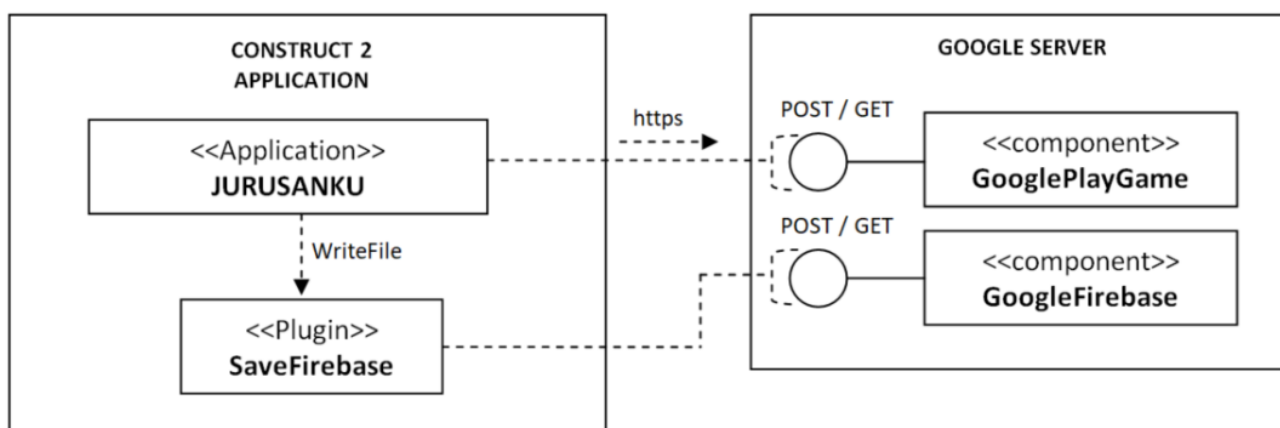


Figure 4: JURUSANKU Application

The definitions of the picture above are as follows:

- Construct 2 Application is the software to make a mobile application.
- Save Firebase, is a plugin for storing user data, ex: name and email that were using GET/POST from the Google Firebase server.
- JURUSANKU uses the Google Play Game component to log in players.
- Google Play Game is a Google component used to log players into JURUSANKU application.
- Google Firebase is a Google component whose function is to store user data.

Validation Results

The results of the validation by media experts getting the following results. Aspects assessed include: (1) icon and button functions, (2) fast loading process, (3) ease of operation of the application, (4) the application runs on all mobile devices, (5) the application does not hang or crash, (6) the questions and test results went well, (7) font size and layout, (8) login and registration functions, (9) application size, and (10) clarity of instructions for use.

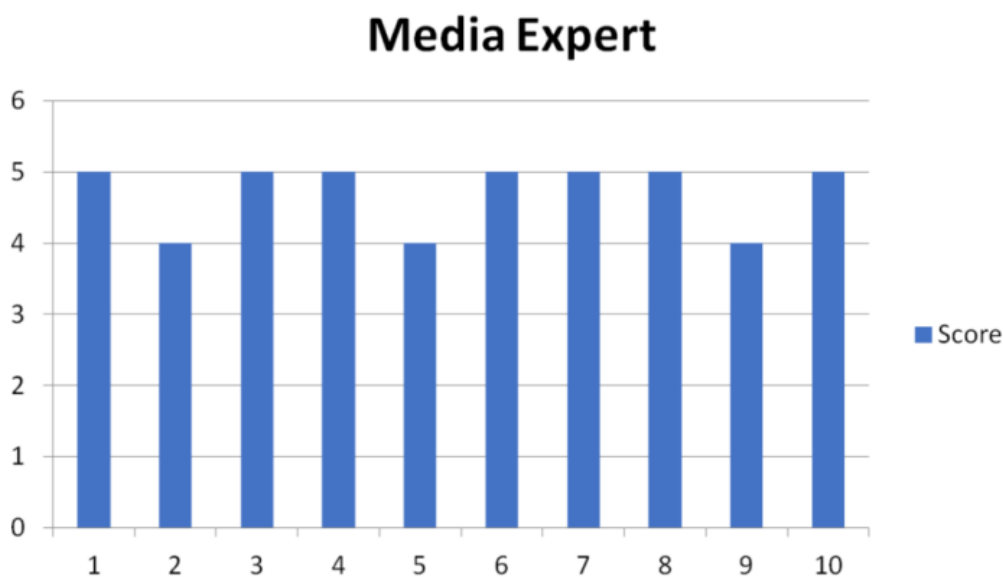


Figure 5: Result Validation by media Expert

While the result of the validation by counseling teachers getting the following results. Aspects assessed include: (1) the correctness of the contents of the questions, (2) the use of language that is easily understood, (3) questions presented coherently, (4) the depth and accuracy of the questions, and (5) the materials are arranged according to students' needs, (6) the application helps the counseling teacher (7) the accuracy of multiple intelligence tests, (8) the accuracy of the Riasec test, (9) the accuracy of the learning style test, and (10) the application can motivate and attract students' attention.

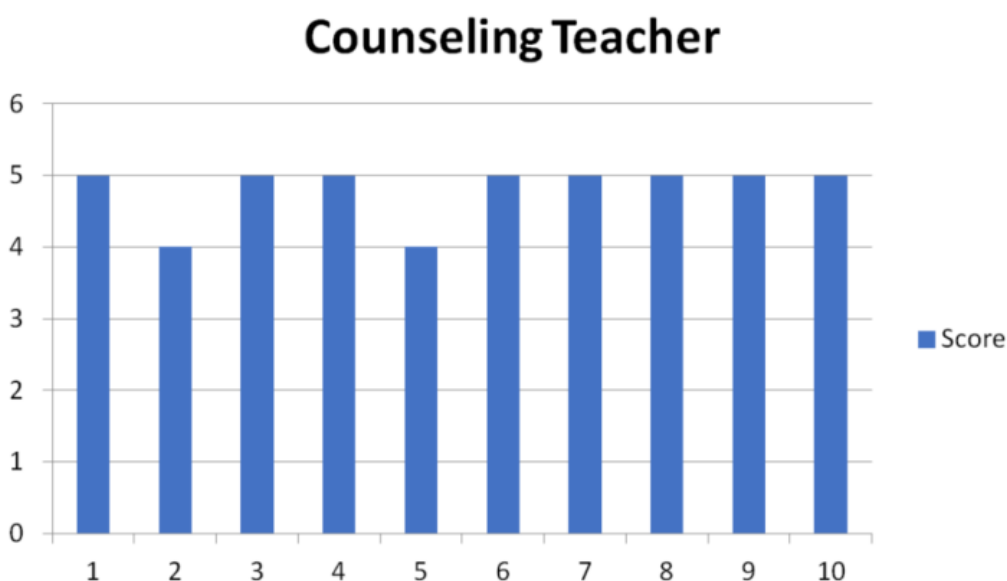


Figure 6: Result Validation by Counseling Teacher

From the results of the validation of media, experts obtained a score of 94%, which obtains very valid qualifications and can be implemented widely. From the result of the validation of counseling, teachers obtained a score of 96%, which obtains very valid qualifications and can be implemented widely. From this, it can be concluded that the JURUSANKU application can be used to assist in making decisions for choosing majors.

Results of Field Tests

The results of a questionnaire given to 40 high school students Wachid Hasjim Lamongan about the benefits of using the JURUSANKU. The aspects assessed in the questionnaire included (1) the application helps to choose a major, (2) students need this application, (3) the application is easy to use, (4) students are motivated after using this application, and (5) the test results match student interests.

Student High School Wachid Hadjim Maduran

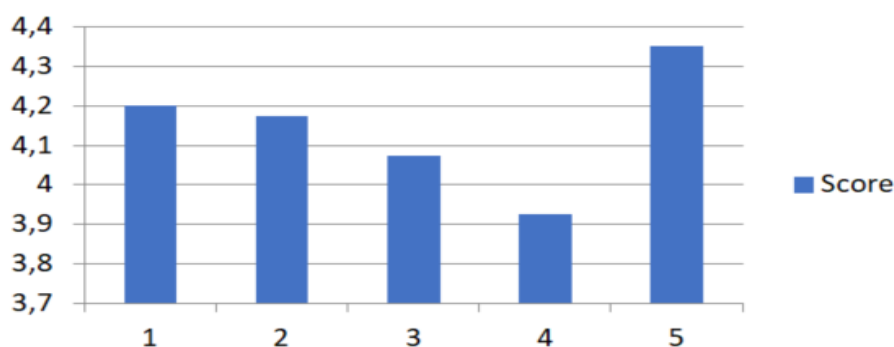


Figure 7: Result of field test

From the picture above, the results obtained for item 1 are 4.20, item 2 is 4.18, item 3 is 4.08, item 4 is 3.93, and item 5 is 4.35. The score obtained from field trials is 82.96%, which means it is valid and can be implemented widely.

CONCLUSION

JURUSANKU is a mobile application that helps high school students to choose a major by combining three types of tests from the Riasec test, the learning style test and the multiple intelligence test.

From the results of the validation to the media experts the value obtained was 94.00% which has valid criteria and is suitable to use, the results of the validation to the counseling teacher obtained a value of 96.00% which has valid criteria and is suitable for use and from the results of field test obtained a value of 82.90%, has valid criteria and is suitable for use.

From the results of implementation, several parts need to be suggested, and future works, among others: (1) Develop a version for iOS, (2) Add images and animations so that the application does not have a monotonous display, and (3) add more functions like sharing the results to social media.

LIMITATION AND STUDY FORWARD

This research still has many limitations. This research was only conducted at 1 school and the sample used was still limited for a few students. For further research, it may be possible to research other schools and more student samples to produce more valid and accurate research data.

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AUTHORS CONTRIBUTION

In this research, The first author was responsible for initiating the idea of research concepts, theories, and methodology. These concepts were discussed with second, third, and fourth authors. The second author was responsible for collecting the data and analyzing the data. The third author was responsible for writing the manuscript and general editing before submission. Finally, The Fourth author was responsible for designing and developing JURUSANKU Mobile Application.

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