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# Design and Build Applications for Choice of Vocational Schools Using the Simple Additive Weighting Method

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Article Information	Abstract
Submitted : 11 Apr 2023 Reviewed: 23 Apr 2023 Accepted : 27 Apr 2023	Vocational high schools provide knowledge of skills, interests, and talents according to vocational fields so students can face the world of work. The phenomenon that occurred in February 2022 stated that most SMK graduates were ready to work. Because of this, the data from the Central Bureau of Statistics on SMK araduates has a total score of 10.38%. So there
Keywords	is unemployment and a lack of interest and talent in choosing a vocational field. The nurness of this study is to make a vocational choice application
Android, Vocational Choice, Simple Additive Weighting Method.	that can determine the right choice of major according to the grades and abilities of prospective students. This study uses the Simple Additive Weighting (SAW) method. The data used is data on the average report card scores of prospective students when they are in junior high school (SMP, MT, or equivalent). Which then is used as a criterion in the process of calculating the SAW method. The research results obtained are worth preferences and multiplication results to get the best alternative majors by ranking preference values. The results of the validation assessment data from the three validators obtained an average of 0.97% called "valid,", while student responses obtained a value of 84.45% categorized as "very practical" in each response tested. A total of 30 students were sampled. 6 students majoring in Accounting, 6 majoring in Economics, 6 majoring in Office, 6 majoring in Agriculture, and 6 majoring in Software Engineering were chosen.

#### A. Introduction

The explanation conveyed by Rupert Evans (1978) is that "Vocational education is a contraction of knowledge in developing individual abilities and potential in the world of work which is supported by vocational fields that can refer to the work". So the Vocational High School contributes to competency expertise from vocational fields based on interests, talents, and colleagues. This was conveyed by Prosser (1950:2), that vocational education is an alternative to developing interests and talents and supporting a person with a personality type that can make a person have expertise in that field[1]. The purpose of vocational education in Vocational High Schools (SMK) is to prepare students' abilities to continue on to a higher level of education and prepare students to enter the workforce [2]. Then in decision-making or decision support systems in vocational fields at SMK using research conducted by Sigit, HT (2022), namely the Simple Additive Weighting method has advantages in making assessments that can provide major criteria and weight values on variables such as interests, talents, and colleagues [4]. In this case, the background of this research is that some graduates of SMP/MTs students are still confused in determining which majors suit their interests and talents, resulting in less optimal results in the learning process, a lack of doubts about students in the chosen majors, and lack of actual information on majors. - majors in SMK. The following is an explanation of the incongruity data on vocational choices in Vocational Schools provided by the school:

No	vocational choice	The	Vocational fit		Vocational Inconsistency	
		number of student	Amount	%	Amount	%
1	Accountancy	25	10	15,62%	15	20,27%
2	Economy	30	14	21,88%	16	21,63%
3	Office	26	12	18,75%	14	18,92%
4	Agriculture	33	17	26,57%	16	21,62%
5	RPL	24	11	17,18%	13	17,57%
	Amount	138	64	100	74	100

Table 1. Inconsistency of Vocational Choices in Vocational Schools

Source: Administration of SMK Negeri 1 Tapung Hilir

As seen from Table 1 above, it shows that several majors at SMK Negeri 1 Tapung Hilir have majors in Accounting, Economics, Office, Agriculture, and Software Engineering with significant differences in interests and talents.[5], Therefore choosing a vocational field that is subject to initial observation at SMK can be a mental burden for SMP/MTs graduates and their parents students who graduate from SMP/MTs feel indecisive in making decisions. So this will result in a less effective learning process for students and student concentration in exploring these majors. Therefore, researchers provide solutions with vocational choice applications that can determine students' interests and talents in determining vocational fields in SMK[6]. This study aims to design an Android-based application that can be accessed anytime and anywhere. This is the process of designing this application requires an analysis of personality types, interests, and talents, making designs, and developing, implementing, and evaluating product results. So the application of vocational choice can be a sophisticated breakthrough in a decision in determining vocational fields in SMK. Based on interests, talents, and colleagues on vocational choice refers to Holland's theory entitled "Vocational Personality Theory and Work Environment"[7], which explained that the development of one's interests and talents is seen in personality in finding choices in vocational fields that are supported in the work environment. Thus the theory derives from worldviews and occupations that satisfy a preferred personal orientation.

Based on the recommendations from this study, a vocational choice application was designed using the Simple Additive Weighting (SAW) method to make recommendations for selecting majors at SMK, with a case study at SMK Negeri 1 Tapung Hilir-Riau. To be able to choose a major that suits your needs, talents, and colleagues, such as the majors at SMK Negeri 1 Tapung Hilir-Riau, namely accounting, economics, accounting, agriculture, and software engineering, you must use the SAW method which is based on thoroughness in evaluating alternatives, from the results of calculations based on the level of weighting needs.

## B. Literature Riview

1. Vocational Education

Vocational education is National Education which is contained in Number 20 of 2003 which regulates vocational education which can provide specific abilities and potential for someone to explore vocational fields so that they can prepare to enter the world of work[8].

The definition of vocational education has 2 objectives, such as general objectives which can increase students' faith and piety to God Almighty, the potential of noble character, knowledge, and insight, while the specific objectives are preparing students for knowledge, competence, technology, and art as well as independently so that they can enter the work environment in the industrial world at medium behavior with their fields[9].

Likewise in vocational education which can be seen from the curriculum that is appropriate to the world of work, so that the contribution of schools to the world of work is clear in the context of pedagogy, then applying it to schools and the world of work is relevant to learning at school to hone potential skills and abilities, this is related that between academic education in schools and the world of work is consistent and connected[10].

2. Interest

Interest is something that pleases or becomes the center of individual attention to objects that can provide comfortable situations, and activities that are liked and find attractiveness. Therefore the theory of vocational interest can provide a framework for viewing the characteristics of people and the work environment by one's interests, to be able to bring a person to behavior that is determined by the interaction between vocational personality and the environment such as choice of occupational fields, behavior, social which is predicted by type a person's interests and the model of the work environment[11].

Individual skill competency depends on vocational interest which is an interest in an area of expertise that is high for students because studying subjects in the learning process and majors with confidence will be able to generate interest in the major. So that the success of students in the learning process will be even greater if the interest in the interests of the majors will make people motivated and encourage people to have free things[12].

Furthermore, in vocational interest is a trait that plays an important role in career selection because vocational expertise is a characteristic of a person in a work environment. Therefore, SMK students have potential in one field that can master good vocational competencies for students to enter the world of work[13].

3. Talent

Talent is a special ability that stands out in various things that make a person feel happy and is found within the individual. Then talent will emerge if it can be created or trained to give birth to potential and ability in a particular field. According to Ma'mur (2012) explains that talent is classified into 3 types, namely:

- a. Special talent is a talent possessed from birth
- b. Hereditary talent is talent passed down by the family or environment.
- c. General talent is a talent that arises to cause effects or be affected by the surrounding environment[14].

Furthermore, talent in choosing vocational fields in student vocational schools can appear in individuals influenced by two factors, namely internal factors and external factors, while internal factors, namely the emergence of self-personality and include physical, talent, psychological, intellectual, and maturity, then for external factors include the surrounding environment such as colleagues, social, and the community environment, this can raise one's doubts about vocational choices.

4. Peers

According to Santrock (2007) explaining that peers provide individual development in terms of age and mindset so the peer environment influences which are very important in the choice of vocational fields in Vocational High Schools, which is based on the pedagogical view that everyone who gathers with peers is more able to improve these characteristics.

The support for peer research conducted by several studies explains that students who gather in a group of peers will have a huge influence on career choices. therefore peer advice, peer encouragement, and education. However, students deny that they seek validation of their career decisions from their peers[15].

## C. Research Method

Designing selected applications in vocational schools, the Simple Additive Weighting (SAW) method is based on interests, talents, and colleagues using. Then design is the process of designing a design concept to manufacture, the vocational choice application using Research and Development (R&D) using the 4-D development model researched by Thiagarajan which is carried out through 4 stages, namely define, design, develop, and dissemination[16].

Analysis of Android-based vocational choice applications provides decision information in vocational fields at SMK so that students can find appropriate or linear majors based on interests and talents. There is interaction between the admin and the variables concerned in making major decisions, as can be seen from the explanation of the design from the figure 1 is Use Case Diagram:



Figure 1. Use Case Diagram

Then this can be analyzed including tracing analysis of the validity of vocational choice applications, practicality of applications, and analysis of effectiveness in addition to test reliability questions, as well as the method used Simple Additive Weighting (SAW)[17], The steps of the SAW method in determining major decisions in SMK:

- a. Determine the SAW alternative, in determining the alternative it is explained in the majors available at Tapung Hilir 1 State Vocational School such as Accounting, Economics, Office, Agriculture, and Software Engineering. Then the department is a recommendation from the departments included in the school.
- b. Create criteria and weights, then find criteria based on interest, aptitude, and colleagues' variables. In determining the weight of each variable, there is a decision from the school, which is 0.36 for the interest variable, while 0.30 is for talent, and 0.34 for colleagues.
- c. Decision Matrix Normalization Determine the decision matrix based on the criteria of interests, talents, and colleagues in vocational choices and produce recommendations for majors, the normalized matrix R is obtained by normalizing the matrix.
- d. Using the weight vector and the normalized matrix product R, multiply the Decision Matrix by the criterion weights.

e. Each preference on major assessment based on interests, talents, and colleagues see the highest score produced on the test.

The procedure is the flow of the design on the choice of vocational regarding the process flow of the system[18]admin which includes a username and password that can verify data and store data in the database. The subjects of the research conducted were 30 students from each department at the Vocational School for practical trials designed for the application to be given to class X students at the Vocational School and 3 lecturers at the Faculty of Engineering, Padang State University, after the type of data collection use Quantitative and qualitative data are included in the category of data this research uses. Instrument validation, practicality, and reliability show consistency in answering a statement.

#### D. Result and Discussion

Based on research that is relevant to Zarra Maziyyah's research (2021), entitled Design and Build a Decision Support System for Finding Student Compatibility in Choosing Majors on Web-Based Campuses, Using the Simple Additive Weighting (SAW) Method," this research examines how to determine college majors by using the Simple Additive Method (SAM). This research requires some data, including grades for high school subjects in semesters 1 to 5 and intelligence test scores. the results of the data obtained using the SAW method on product results according to recommendations The research method used is qualitative because the data entered is in the form of numeric data. The data needed is from high school report cards for semesters 1–5, as well as multiple intelligence test scores. Then the data is processed using the Simple Additive Weighting method to produce the top 3 recommendations. The test results show a percentage accuracy of 37.5%.

whereas research conducted by Asep Supriyanto (2022) explains that there is data on the average value of the report cards used as criteria in the calculation process for the Simple Additive Weighting method. The results of this study in the calculation of preference values and multiplication results to get the best alternative majorby ranking preference values. Of the 10 students who were sampled, 5 people selected students majoring in accounting, three selected students majoring in audio video engineering, and two studentsselected students majoring in multimedia. The results of the research will discuss the Design of the Vocational Choice Application which includes data presentation, the design of the Android-Based Vocational Choice Application, and the analysis of the results of the application design based on interests, talents, and colleagues whose aim is to provide information that makes it easier for guidance counselors to determine students' personalities. From the results of the data assessment obtained several validation tests, practicality, and reliability in information system programs that can facilitate the work of counseling officers in determining vocational students who will continue their further education. The following describes the stages of the **Vocational Choice Application:** 

1) Design Results

At the application design stage allocate application needs to the vocational field supported by software by forming the overall system architecture, at the stage of having to measure instrument items that can be analyzed vocationally in SMK based on interests, talents, and colleagues. The following are some pictures of the results of the vocational choice application design.

a) Application Start Page

Fig2 describes the initial appearance of the vocational choice application which will lead students to the main page.



Figure 2. Application Start Page

b) Login Form

The following shows the SMK application login display at the SMK level, as shown in the fig 3 The username and password have been registered in the database, if the user has an account, a registration will be carried out to be able to enter the dashboard page.



Figure 3. Login Form

c) Application Dashboard

On the application dashboard there are several student menus, vocational information, vocational analysis, and logout, in this case the user can fill in personal data first, then on the dashboard menu there is also vocational information which contains recommendations for majors and prospects for majors that support the user's career development. Here's a fig 4.



Figure 4. Application Dashboard

d) Vocational Analysis

On the vocational analysis menu, several statements refer to the majors of interest and have the results of an assessment of the statements that have been answered by the user. As shown in the Fig 5.



Figure 5. Vocational Analysis

At the development stage of this application, the quality and suitability of the vocational choice application will be tested, this is recommended by the department by conducting product testing using aspects of the product test used for reliability testing, starting from operational data, so that the data results are obtained. So that the test can be carried out well. The following is an explanation of the data carried out by validation tests, practicality and effectiveness of the products carried out by researchers:

1. Test product validity

The data assessed by the validator on the Vocational Choice Application in Vocational High Schools used a questionnaire covering several aspects, namely a) design, b) operation, and c) benefits, with 3 media validators. The following Table 2 explains the results of the tabulation of validation data for lecturers:

No	Validators	Evaluation	Category
1	Validators 1	0.96	Valid
2	Validators 2	0.97	Valid
3	Validators 3	0.98	Valid
	Average	0.97	Valid

Table 2. Data Validator Results

Table 3. Results SPPS
Intraclass Correlation Coefficient

	Intraclas s	95% Confidence Interval		F Test with True Value 0			ue O
	Correlati onb	Lower Bound	Upper Bound	Value	df1	df2	Sig
Single	.411a	.201	.639	3.794	22	66	.000
Measures Average Measures	.736c	.502	.876	3.794	22	66	.000

Two-way mixed effects model where people effects are random and measures effects are fixed.

a. The estimator is the same, whether the interaction effect is present or not.

b. Type C intraclass correlation coefficients using a consistency definition. The between-measure variance is excluded from the denominator variance.

c. This estimate is computed assuming the interaction effect is absent, because it is not estimable otherwise.

Based on the results of the data carried out by the validator, it shows that the results of the average value carried out by 3 validators give a value of 0.97, so the vocational choice application in Android-based Vocational Schools is included in the "Valid" category.

2. Test Practicality

Practical tests are examined in demonstrating the usefulness of the application to be carried out by students and teachers. The following is an explanation of the practical results:

Table 4. Data Teacher Practical Results				
No	Validators	Evaluation	Category	
1	Eligibility of Content and	88%	Very Practical	
	Purpose			
2	Appearance	90%	Very Practical	
3	Benefits	90%	Very Practical	
Average		89.3%	Very Practical	

Table 4 explains that the results of the practicality of the teacher's response data provided an average value of 89.3%. So the results of the practicality test were used to see the results of the teacher's practicality test. The Vocational Choice Application in Android-based Vocational Schools was included in the "Very Practical" category.

Furthermore, the data on the practicality test obtained by students is to measure students' responses to practicality in using the media that was developed. Look at Table 5 as explained:

No	Aspect		Evaluation (%)	Category
1	Eligibility	of	84.67 %	Very Practical
	Content	and		
	Purpose			
2	Appearance		86.56 %	Very Practical
3	Benefits		82.14 %	Very Practical
	Average		84.45 %	Very Practical

**Table 5.** Data Student Response Practicality Results

Table 6. Data SPSS Reliability		
Reliability Statistics		
Cronbach's		
Alpha	N of Items	
.718	17	

Based on Table 4 the results of the average practicality value in the Vocational Choice Application in Vocational Schools from student responses are 84.45%. So from the results of the data, the application is categorized as "Very Practical", so that it can show users in determining vocational fields in SMK according to their interests, talents, and colleagues.

#### E. Conclusion

After doing this, it can be concluded that the data from the vocational choice application at the SMK level has been successfully designed. At this stage the results of the tests carried out by researchers have application value, then the assessment data that is validated on the application of vocational choice in SMK is the result of data obtained from the validation test on the validator with a questionnaire (questionnaire) covering several aspects in determining applicability or implementation of applications that will be used by students and obtained an average of 0.97 with the category "Valid". Then carry out a practicality test on 2 technology teachers with a value of 89.3%, so that they are categorized as "Very Practical". This vocational choice application is designed to provide information about majors in Vocational High Schools that come from someone's recommendations in determining vocational fields in Vocational High Schools. Therefore research on the Application of Vocational Choices in Vocational High Schools can find out which majors are suitable according to interests, talents, and colleagues so that the vocational choice application components include data processing, information, and model design from vocational fields in SMK.

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