Predicting the Success of Entrepreneurial Students with an Expert System Based Approach

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ABSTRACT

Entrepreneurial potential in students must be measured with the appropriate instrument. One of the factors that influences the instrument is through entrepreneurial personality. Through this personality instrument, it will be adjusted to the level of development and needs of students so that the process of transferring knowledge by experts can be channeled properly. However, the instrument is not sufficient to be implemented, the readability of the instrument is still generalized for all ages, the number of available entrepreneurship experts is still small, and so on. The research aims to develop a model for measuring entrepreneurial potential through entrepreneurial personality using an expert system model. The type of research used is development research, using the four-D model, consisting of define, design, development, and disseminate stages. The average valid score on the expert system is 0.887%, the practical score is 91.11 %, and the effectiveness score is 82.47 %.

Keywords: Entrepreneurship Personality, Expert System, Bayes, R&D, Inventory, Four D.

1. INTRODUCTION

Understanding the entrepreneurial personality is important because it can help individuals become more self-aware and make better decisions [1]. When individuals know their entrepreneurial personality, they can identify their strengths and weaknesses, as well as their tendencies and preferences [2][3]. With this knowledge, you will be able to make better decisions and make action plans that are in accordance with the strengths that exist in the individual.

Furthermore, knowing entrepreneurial personality can help improve communication and teamwork [4][5]. By recognizing the strengths and weaknesses of yourself and team members [6], you can develop strategies to work more collaboratively and productively [4]. Additionally, understanding the entrepreneurial personality can help you communicate more effectively with others, leading to better business relationships [7].

Overall, having an awareness of an entrepreneurial personality can help individuals become better entrepreneurs. This can help them identify areas for improvement, and leverage strengths to achieve goals more effectively. Knowing the entrepreneurial personality will be able to create a roadmap that aligns with the personality type [8], leading to greater success

in business endeavors [9]. Therefore, the main purpose of this study is to guide individuals to determine the potential of entrepreneurial personality within individuals and to provide career recommendations according to their entrepreneurial personality with instruments that have been developed using an expert system [10][11].

An expert system is a type of artificial intelligence (AI) technology that uses a knowledge base and inference engine to solve problems or make decisions [12][13]. The knowledge base consists of a set of rules or facts that have been programmed into the system [14], while the inference engine is responsible for applying the rules to the data and generating conclusions. The process typically begins with the system asking a series of questions to gather information about the problem or decision that needs to be made [15]. The answers to these questions are used to narrow down the possible solutions or recommendations.

The inference engine then uses the rules in the knowledge base to evaluate the data and generate conclusions [16][17][13]. It may use different techniques, such as deduction or induction, to arrive at the best possible solution or recommendation. Once the system has generated a conclusion or recommendation,

it presents it to the user for review and confirmation. The user can then accept or reject the recommendation, or provide additional information to refine the results.

Expert systems can be designed to operate in a variety of ways, depending on the specific requirements of the application. They can be rule-based, where the knowledge base consists of a set of rules that are applied in a specific order, or case-based, where the system learns from previous cases and uses that information to generate recommendations. Overall, expert systems provide a powerful tool for organizations to make more informed decisions and operate more effectively in a wide range of industries and applications [19][20][21].

Expert systems have many methods that can be used [22][23][24]. But there are some methods that can't be used in a circumstance [25][26]. In this study, the method used is the R&D method with the four-D development model. While the subject of entrepreneurship personality measurement of 80 vocational students consisting of 40 students of SMK 1 Muhammadiyah Padang and 40 students of SMKN 4 Padang regarding their plans after graduating from school.

2. METHOD

This section will explain the research method used, while the research method is a research and development (R&D) method with a four-D development model : Define, Design, Develop and Disseminate.
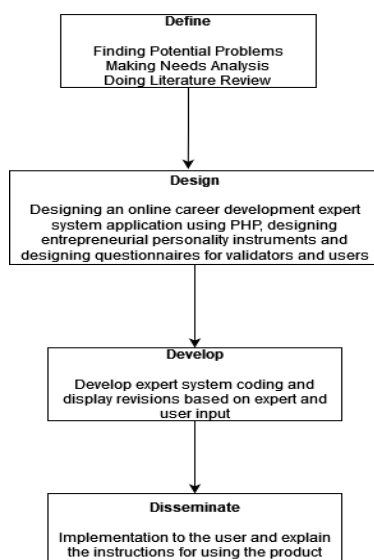

Figure 1. Expert system application development stages

2.1. Define Stage

This research begins with the defining stage where all aspects of needs will be analyzed using a questionnaire which will be distributed to research subjects, namely students of SMK 1 Muhammadiyah Padang and students of SMKN 4 Padang.

2.2. Design Stage

The next stage is the design stage. The process of designing an entrepreneurial personality instrument involving experts, be it psychologists, entrepreneurship experts and language experts, will be carried out at this stage. Then the results of this design will be transferred to the expert system application and can be implemented so that it can be used in the next few years. The description of the process of designing entrepreneurship personality instruments is described in Figure 3:
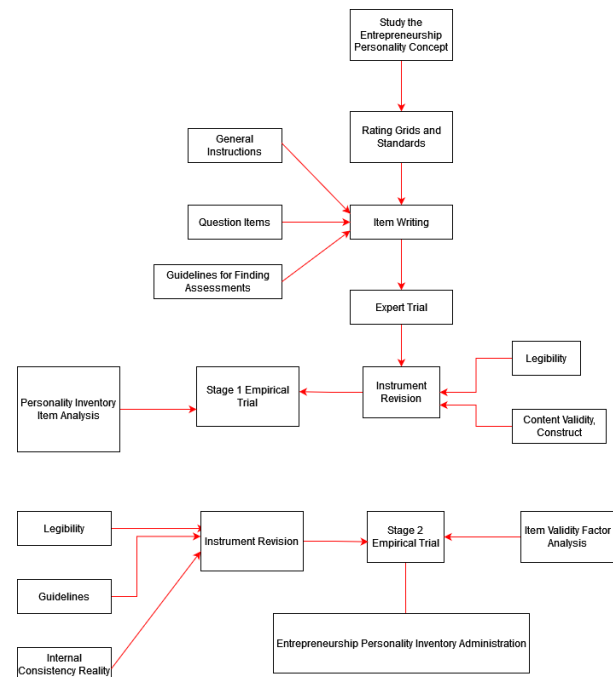

Figure 2. Stages of Preparation of Entrepreneurship Personality Instruments

2.3. Develop Stage

This development stage aims to produce revised dissertation products based on expert input and trials on users. There are two steps in this stage, namely as follows:

2.3.1. Expert Validation

This expert validation serves to validate the construct and content of the entrepreneurship personality inventory instrument prior to testing and the results of the validation will be used to revise the initial product. The entrepreneurship personality inventory instruments that have been compiled will then be assessed by evaluation expert lecturers, applications, models, model books, application use manuals and linguists lecturers, so that it can be seen whether the entrepreneurship personality inventory instruments are feasible or not. The results of this validation are used as material for improvement for the perfection of the

developed entrepreneurship personality inventory instrument. After the first draft was validated and revised, draft II was produced. Draft II will then be tested on students in the limited field trial stage

2.3.1 Product Testing

After expert validation, limited field trials were carried out to find out the results of applying the entrepreneurship personality inventory instrument in class, the first measurement was carried out on 30 students outside the research sample, while the instrument given was an entrepreneurship personality inventory instrument using an expert system, a practical instrument of the product developed

2.3. Disseminate Stage

After the limited trial and the instrument have been revised, the next stage is the dissemination stage. The purpose of this stage is to disseminate the entrepreneurship personality inventory instrument. In this study, only limited dissemination was carried out, namely by disseminating and promoting the final product of the entrepreneurship personality inventory instrument on a limited basis to counseling guidance teachers, students of SMK 1 Muhammadiyah Padang and students of SMKN 4 Padang who chose the Information and Communication Technology area of expertise.

3. RESULTS AND DEVELOPMENT

At this stage, the four-d development stages will be fully described in order to become a user-friendly expert system.

3.1 Define Stage

The results of data analysis on Needs Analysis on product development using the Expert System can be explained through a description of the basic statistics of the research data in Table 1.

Table 1. Basic Statistics Research Results Needs Analysis

N	Valid Missing	73
Mean		41.52
Median		42.00
Mode		42a
Std. Deviation		4.314
Variance		18.614
Range		22
Minimum		27
Maximum		49
Sum		3031

Based on Table 1 above, it can be stated that the average score for needs analysis is 41.52, thus it can be

determined that the percentage of needs analysis is 83.04% with a high level of need category for System development using an Expert System. While the frequency distribution of research data distribution can be seen in Table 2.

Table 2. Frequency Distribution of Needs Analysis Data

BK	Kelas Interval	Fo	(%) Fo
1	27 – 29	1	1.37
2	30 – 32	3	4.11
3	33 – 35	2	2.74
4	36 – 38	11	15.07
5	39 – 41	13	17.81
6	42 – 44	18	24.66
7	45 – 49	25	34.25
	Total	73	100

Based on Table 2 it can be seen that the highest score is in Interval Class 45 – 49 with a frequency of 25 (34.25%) while the lowest score is in the internal class 27 – 29 with a frequency of 1 (1.37%). For clearer distribution of data based on frequency distribution, it can be seen in the following histogram:
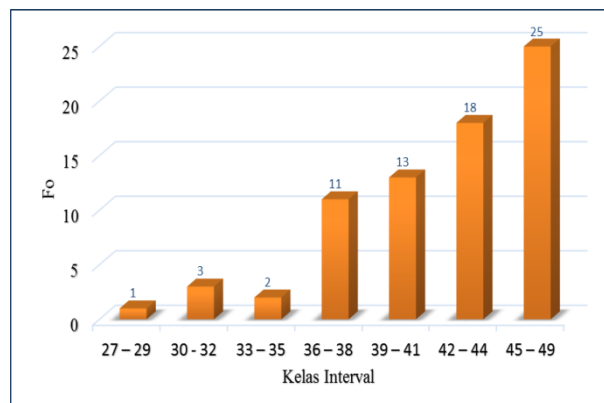

Figure 3. Frequency Distribution of Needs Analysis

3.2. Design Stage

At the design stage, it will be described in detail how the process of entrepreneurship personality theories is collaborated with an expert system. Following are the results.
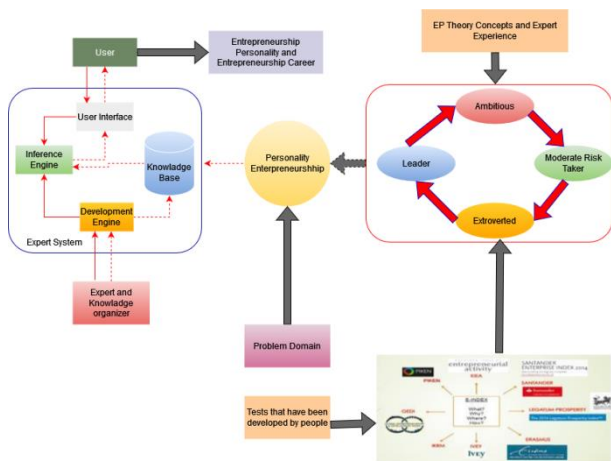
Figure 4. How the Expert System Works in Determining Entrepreneurship Personality Potential

3.2 Develop Stage

At this stage, building or constructing personality types is carried out based on the data that has been distributed and comparisons are made with expert data using the Confirmatory Factor Analysis method as shown in Figure 5.
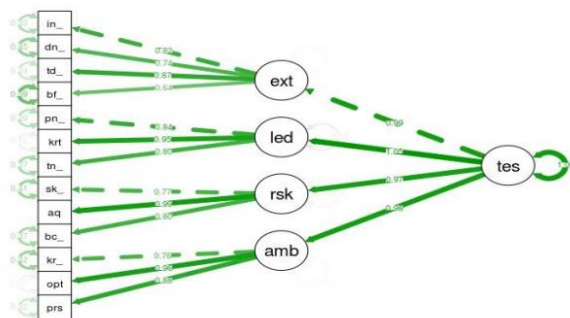

Figure 5. Results of Entrepreneurship Personality Construct Validation

Confirmatory Factor Analysis is a model to see whether data from the field is entered with a fit structure or not. For the fit of the model with the data obtained, there are several measures, the Tukey-Lewis Index (TLI), Comparative Fit Index (CFI) and Root Mean Square Residual (SRMR). The fit value for each size is TLI > 0.90; CFI > 0.95; and SRMR < 0.08 . The results of the Entrepreneurial Personality fit test are displayed in table 2.

Table 3. Confirmatory Factor Analysis Fit Test Value

CFI	TLI	SRMR
0.81	0.75	0.01
Marginal Fit	Marginal Fit	Fit

Based on the construct validation that was carried out using confirmatory factor analysis, a high correlation was obtained between the latent variable and the manifest variable. From the graph shown above, the correlation between the extrovert latent variable and the interaction manifest variable obtained a value of 0.82, with an external manifest variable of 0. .74, with the manifest variable not liking attachment, a value of 0.87 was obtained, while the correlation between the extrovert latent variable and the manifest variable of practical thinking obtained a value of 0.64. Meanwhile, the correlation between the latent variable Leader and the manifest variable influencing other people obtained a value of 0.84, while the creative manifest variable obtained a value of 0.95, and the responsible manifest variable obtained a value of 0.80.

3.3 Disseminate Stage

At this stage the dissemination of the application is carried out and see the level of effectiveness of the Expert system application that has been built.

3.4.1 Validity Analysis

The validator's assessment in this section is to provide an assessment (judgment) of the content of the application being developed. The validation results can be seen in Table 4.

Table 4. Validity Analysis Results

No. Item	Aiken's V score	Information	Results of Assessment Aspects
Item 1	0.833	Valid	Design Aspect 0.903 Valid
Item 2	0.917	Valid	
Item 3	0.917	Valid	
Item 4	0.917	Valid	
Item 5	1.000	Valid	
Item 6	0.833	Valid	
Item 1	0.833	Valid	Operational Aspect 0869 Valid
Item 2	1.000	Valid	
Item 3	0.833	Valid	
Item 4	0.833	Valid	
Item 5	0.833	Valid	
Item 6	1.000	Valid	
Item 7	0.750	Valid	
Item 1	0.750	Valid	Benefits Aspect 0.875 Valid
Item 2	0.917	Valid	
Item 3	0.917	Valid	
Item 4	0.917	Valid	
Item 1	0.833	Valid	Language Aspect 0.900 Valid
Item 2	0.917	Valid	
Item 3	0.833	Valid	
Item 4	1.000	Valid	
Item 5	0.917	Valid	

3.4.2. Practical Analysis

The results of the effectiveness of the Expert system application product development can be described in table 4.

Table 5. Practicality Analysis Results

No Item	Score	Information	Results of the Practicality Assessment Aspect
Item 1	84.11	Practical	APPLICATION Aspect Format 86.58 Practical
Item 2	81.92	Practical	
Item 3	92.60	Very Practical	
Item 4	85.48	Practical	
Item 5	91.51	Very Practical	
Item 6	83.84	Practical	
Item 1	80.55	Practical	APPLICATION Aspects of Content 85.07 Practical
Item 2	83.29	Practical	
Item 3	90.41	Very Practical	
Item 4	83.56	Practical	
Item 5	90.96	Very Practical	
Item 6	81.64	Practical	

3.4.2 Effectiveness Analysis

The results of the analysis of the effectiveness of data on system development can be explained through a description of the basic statistics of the research data in Table 6.

Table 6. Effectiveness Analysis Results

BK	Kelas Interval	Fo	(%) Fo
1	77 – 83	1	1.37
2	84 - 90	3	4.11
3	91 – 97	3	4.11
4	98 – 104	8	10.96
5	105 – 111	17	23.29
6	112 – 118	22	30.14
7	119 – 127	19	26.03
	Total	73	100

4. DISCUSSION

Based on the results of the construct of the entrepreneurship personality inventory instrument, 4 personality types were obtained based on the correlation of indicators obtained from the results of factor analysis using confirmatory factor analysis (CFA). The 4 personality types formed from the results of this factor analysis were Extrovert, Leader, Moderate Risk Taker and Ambitious.

The effectiveness of the Computer Based Inventory for Entrepreneurship Personality (CBI-EP) model uses an expert system. Based on the results of the analysis of the effectiveness instrument, an effectiveness value of 82.47 (Effective) is obtained. Based on the analysis that has been carried out from the 30 statement items, there are 3 invalid statement items, namely item numbers 3, 10 and 21. The statement items are considered invalid because they have a Corrected Item-Total Correlation score <0.361 as a critical price r table for N (trial sample) = 30

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