



## EXPERT MODEL SYSTEM ON ENTREPRENEURSHIP PERSONALITY

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**ABSTRACT:** One of the problems faced by counseling teachers and counseling is their limited knowledge on how to direct students' interests in accordance with their personalities. Vocational high schools really need counseling program for career and counseling to guide the students' career match their personalities in order to reduce the number of unemployment who graduated from vocational high schools. Due to this fact, then it requires an expert in psychology or counselor that can direct the students to the right career suitable with their personality based on the result of the test or psychological assessment which have done by the experts in psychology. The high cost of psychological assessment, limited number of psychological experts and very slow result announcement, makes the students have difficulty in having counseling with the experts if they want to decide their chosen career that they want to have in the future. To solve this problem, it needs a system which has an ability like an expert in psychology. This system is equipped with some references knowledge about personality and interest in chosen career by the students in line with the students' personality. The main purpose of this research is to develop a web-based expert system using basic rules with chaining forward referenced method and PHP language program which meant to help the students in having counseling about their career through online, adaptive, practical, and efficient way. This research is focused on entrepreneurship career interest for students of vocational high school majoring in technological information, using 4D model of research methodology (Define, Design, Develop, and Disseminate). Data analysis used in validating factor is factor analysis with CFA type (Confirmatory Analysis Factor). This research is done on 200 vocational high school students who have studied entrepreneurship. From this research, it is found that there are 5 characters which built entrepreneurship personality namely: Persuader, Creative, Risk taker, Leader and Ambitious which later will become factors in developing CBT-EP program (computer based test for entrepreneurship personality).

*Keywords: Personality; Entrepreneurship; Expert System; Structural Equation Modeling; Confirmatory Factor Analysis.*

### 1. INTRODUCTION

Entrepreneurship derived from the word entrepreneur who refers to a figure or a particular human person. Therefore, discussing the issue of entrepreneurship will never escape from talk about the problems of the people and his personality. An entrepreneur must recognize and understand yourself, this will facilitate them to find, define and lead the path of entrepreneurship that suits their personality [1].

Entrepreneurship it has a very important role, entrepreneurship likened as a driving force in the economy nationally and internationally as well as being a symbol of resilient businesses and over-achievers. On this second Millennium era developed countries doing the revolution in the field of entrepreneurship, they develop a business school for entrepreneurship, the creation of characters, develop competence of entrepreneurship that we can look at '21<sup>ST</sup> Century Competencies', as well as perform the measurement index of sustainable entrepreneurship [1]. While in Indonesia have entrepreneurship programs launched by the Government with the

allocation of funds for the activities of the Studium General entrepreneurship, Integrated Work Study Program (PBBT), Student Business Competition and Expo Indonesia Indonesia Student Entrepreneurship (EXPO KMI). The purpose of all this is to find individuals who have the potential in the field of entrepreneurship. However this program alone turned out to be insufficient to locate seeds entrepreneurship potential. It takes a special selection by using the tool (instrument) is the right [2].

Until now, this was enough tools developed to measure the potential of entrepreneurship as KIA (Kauffman Index Activities Entrepreneurial), Enterprise Index SANTANDER, Legatum Prosperity Index, Erasmus, Ivey, IKRM, GEDI and PIKEN. Each of these instruments has different functions, ways of working and goals in discovering the potential for entrepreneurial, business or country entrepreneurship [3].

In the world of information and communication technology is known for a term Expert System a knowledge-based program that provides solutions with quality experts for

problems in a specific domain. Expert system is a computer pro-gram that mimics the thought process and expert knowledge in solving a particular problem. expert system is seen as a way of storage of expert knowledge in a particular field in the computer program so that a decision can be rendered in conducting reasoning intelligently. General knowledge in expert system taken from a human expert in a particular domain and expert system that attempted to emulate the methodology and performance of an expert on the (performance) [4], [5].

Expert system is not only used in the field of medical, and legal only, the expert system can also

be applied in the field of career guidance and counseling, for career guidance and counseling also constitute an field a large and complex, one of the problems in the field of career guidance and counseling is how do I provide recommendations careers at exactly the right person in accordance with his personality. Therefore the solutions offered to solve this problem is to develop a model of expert system that can provide referrals in particular career entrepreneurship for students of vocational high schools.

## 2. MATERIAL

### 2.1 Material

There are some preparations that need to be done before building an expert system to measure the personality of entrepreneurship. first determine the indicators and criteria as well as the statement items of the entrepreneurship personality, the criterion indicator and the statement item can be determined based on the literature that suits the personality of entrepreneurship. the next stage do validation with expert personality entrepreneurship. After the entrepreneurial instrument finished in validation by experts, then the stage of building the expert system of entrepreneurship personality began to be implemented. the required equipment and software specifications are Intel Ci3-6006U 2.0GHz, 4GB RAM, 500GB HDD, Intel HD VGA, 21.5 FHD, Wifi, Keyboard & Mouse. Software are needed macromedia dreamweaver, MySQL, WebHosting.

### 2.2 General Procedure in Instrument Design

Determine the indicators, criteria and items of the statement to be designed into an entrepreneurship personality instrument.

**Table 1. Instrument Design**

No	Indicators	Criteria	Items of the Statement	Total of items
1	Persuader	Friendly	1,2,3,4,5	20
		Talkative	6,7,8,9,10	
		Open in various situations	11,12,13,14,15	
		Adept at influencing others	16,17,18,19,20	
2	Risk Taker	Likes Challenges	21,22,23,24,25	20
		Thorough	26,27,28,29,30	
		Good analytics	31,32,33,34,35	
		Likes Adventure	36,37,38,39,40	
3	Creative	Imaginative	41,42,43,44,45	20
		High curiosity	46,47,48,49,50	
		Initiative	51,52,53,54,55	
		Confidence	56,57,58,59,60	
4	Leader	Influential	61,62,63,64,65	20
		Visionary	66,67,68,69,70	
		Collaborative	71,72,73,74,75	
		Innovative	76,77,78,79,80	
5	Ambitious	Results-oriented,	81,82,83,84,85	20
		Focus on objectives	86,87,88,89,90	
		Individualist	91,92,93,94,95	
		Never give up	96,97,98,99,100	

### 2.3 Construct Validity Intrument

Contracts that have been validated by experts will be re-tested using Structural Equation Modeling (SEM). this can be seen in figure 1

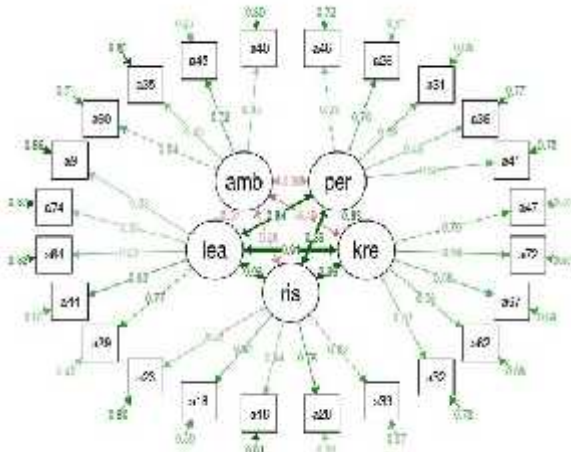


Fig.1 Intrument Validity Using Structural Equation Modeling (SEM)

### 2.4 Expert System Design

An expert system is composed of three main modules [6]:

- a. Knowledge Acceptance Module (Knowledge Acquisition Mode)  
The system resides in the module will receive knowledge from expert. The process of gathering knowledge will used for system development, with the help of knowledge engineer.
- b. Consultation Module (Consultation Mode)  
At the moment the system is in a giving position answer to the problem posed by user, the expert system is in the module consultation.
- c. Explanation Module  
This module describes the decision-making process by system.

In the expert system there are 2 main components [6]:

- a. Knowledge Base  
knowledge is the essence of a system experts, namely the form of knowledge representation from experts. The knowledge base is composed of facts and rules.
- b. Inference Engine (Inference Engine)  
Engine inference serves to guide the process reasoning against a condition, based on the available knowledge base.

Bayes's theorem is a theorem with two different interpretations. In Bayes's interpretation, this theorem states how far the degree of subjective trust should change rationally when there are new clues. In the interpretation frekuentis this theorem explains inverse representation of probability of two events. Bayes probability is one way to overcome the data uncertainty by using Bayes formula is expressed as follows [7].

$$P(H_k | E) = \frac{P(E | H_k)P(H_k)}{\sum_{k=1}^n P(E | H_k)P(H_k)} \quad (1)$$

- $P(H | E)$  : The probability of Hk hypothesis if given evidence E.  
 $P(E|H )$  : The probability of the emergence of evidence E if Hk hypothesis is known to be true  
 $P(H )$  : Hk hypothesis probability, without looking at any evidence.  
 n : Jumlah hipotesa yang mungkin

#### 2.4.1 Data Tables of Entrepreneurship Personality

Table 2. Indicator of Entrepreneurship Personality

Code_Personality	Indicator of Entrepreneurship Personality
K001	Persuader
K002	Risk Taker
K003	Creative
K004	Leader
K005	Ambitious

This personality table is used as a pattern matching information entered by users and knowledge base.

Table 3. Bayes Value

Bayes Value	Bayes Theorem
0.0- 0.2	No
0.3- 0.4	Maybe
0.5-0.6	Most likely
0.7-0.8	Almost Certainly
0.9-1.0	Certainly

Table 3. Criteria of Entrepreneurship Personality

Code criteria	Item Of Criteria	Weight
D001	Smile	0.9
D002	Warm	0.5



<b>D003</b>	Delightful	<b>0.8</b>
<b>D004</b>	Hilarious	<b>0.5</b>
<b>D005</b>	Interesting	<b>0.9</b>
<b>D006</b>	extravagant talk	<b>0.9</b>
<b>D007</b>	interrupting	<b>0.6</b>
<b>D008</b>	likes to be the center of attention	<b>0.5</b>
<b>D009</b>	Adaptable	<b>0.7</b>
<b>D010</b>	Aggressive	<b>0.8</b>
<b>D011</b>	Attention to others	<b>0.8</b>
<b>D012</b>	Kind	<b>0.6</b>
<b>Code criteria</b>	<b>Item Of Criteria</b>	<b>Weight</b>
<b>D013</b>	a good listener	<b>0.4</b>
<b>D014</b>	giving advice	<b>0.4</b>
<b>D015</b>	appreciate opinions	<b>0.3</b>
<b>D016</b>	good at seducing	
<b>D016</b>	good language skills	<b>0.9</b>
<b>D017</b>	good at persuading	<b>0.7</b>
<b>D018</b>	interesting when talking	<b>0.6</b>
<b>D019</b>	enliven the atmosphere	<b>0.7</b>
<b>D020</b>	persistent	<b>0.9</b>
<b>D021</b>	Confidence	<b>0.8</b>
<b>D022</b>	Brave	<b>0.9</b>
<b>D023</b>	Likes outdoor activities	<b>0.5</b>
<b>D024</b>	Stubborn	<b>0.4</b>
<b>D025</b>	High fighting power	<b>0.8</b>
<b>D026</b>	Liked the Count	<b>0.6</b>
<b>D027</b>	Have attention and height	<b>0.5</b>
<b>D028</b>	Persistent,	<b>0.5</b>
<b>D029</b>	Focus	<b>0.8</b>
<b>D030</b>	Quiet	<b>0.4</b>
<b>D031</b>	Like to solve the problem completely	<b>0.8</b>
<b>D032</b>	Humble	<b>0.4</b>
<b>D033</b>	Mathematician	<b>0.8</b>
<b>D034</b>	Logical	<b>0.95</b>
<b>D035</b>	Has a strong principle	<b>0.81</b>
<b>D036</b>	Like freedom	<b>0.95</b>
<b>D037</b>	Brave	<b>0.8</b>
<b>D038</b>	Fighters	<b>0.4</b>
<b>D039</b>	Love nature	<b>0.7</b>
<b>D040</b>	Messy	<b>0.4</b>
<b>D041</b>	Many ideas	<b>0.9</b>
<b>D042</b>	Fancy	<b>0.9</b>
<b>D043</b>	High curiosity	<b>0.8</b>
<b>D044</b>	Initiative	<b>0.5</b>
<b>D045</b>	Many hobbies	<b>0.4</b>
<b>D046</b>	Likes to ask	<b>0.9</b>
<b>D047</b>	Pay attention to many things	<b>0.6</b>
<b>D048</b>	Learn a lot	<b>0.6</b>
<b>D049</b>	Interested in many things	<b>0.5</b>
<b>D050</b>	Like to read	<b>0.5</b>
<b>D051</b>	good at reading opportunities	<b>0.7</b>

<b>D052</b>	be the inspiration of many people	<b>0.6</b>
<b>D053</b>	clever position	<b>0.4</b>
<b>D054</b>	has its own style	<b>0.5</b>
<b>D055</b>	do not like to be ordered	<b>0.4</b>
<b>D056</b>	Not resting on others.	<b>0.45</b>
<b>D057</b>	Dare to take a stand and not fear wrong.	<b>0.6</b>
<b>D058</b>	Not afraid to look stupid	<b>0.8</b>
<b>D059</b>	Dare to speak, argue and criticize	<b>0.7</b>
<b>D060</b>	Have a good self-control and emotional stable.	<b>0.7</b>
<b>D061</b>	not easy to answer	<b>0.4</b>
<b>D062</b>	polite speech	<b>0.6</b>
<b>D063</b>	good lifestyle	<b>0.4</b>
<b>D064</b>	high response	<b>0.8</b>
<b>D065</b>	quickly take action	<b>0.7</b>
<b>D066</b>	Keep learning	<b>0.5</b>
<b>D067</b>	Service Oriented	<b>0.4</b>
<b>D068</b>	Trusting Others	<b>0.5</b>
<b>D069</b>	Seeing Life As A Struggle	<b>0.7</b>
<b>D070</b>	Always Improving Yourself	<b>0.4</b>
<b>D071</b>	loves to work together	<b>0.9</b>
<b>D072</b>	appreciate the opinions of others	<b>0.9</b>
<b>D073</b>	appreciate the ability of others	<b>0.8</b>
<b>D074</b>	loves to share experiences and knowledge	<b>0.5</b>
<b>D075</b>	received criticism	<b>0.4</b>
<b>D076</b>	Self-accepting	<b>0.9</b>
<b>D077</b>	adaptive	<b>0.6</b>
<b>D078</b>	Reflective	<b>0.6</b>
<b>D079</b>	Balances intuition and analysis	<b>0.5</b>
<b>D080</b>	Persevering	<b>0.5</b>
<b>D081</b>	no matter the small changes	<b>0.8</b>
<b>D082</b>	less appreciate the results of hard work of others	<b>0.7</b>
<b>D083</b>	feel success is in the work itself	<b>0.4</b>
<b>D084</b>	like to rush in making decisions	<b>0.5</b>
<b>D085</b>	easily affected	<b>0.4</b>
<b>D086</b>	do not like change	
<b>D087</b>	do not like criticism	<b>0.8</b>
<b>D088</b>	if it fails it will be easy for him to rise up	<b>0.5</b>
<b>D089</b>	strong desire	<b>0.4</b>
<b>D090</b>	firmly on the stand	<b>0.9</b>
<b>D091</b>	do not like crowds	<b>0.6</b>
<b>D092</b>	difficult to work together	<b>0.6</b>
<b>D093</b>	difficult to accept change	<b>0.5</b>
<b>D094</b>	less friendly	<b>0.5</b>
<b>D095</b>	independent	<b>0.8</b>

<b>D096</b>	persistent	<b>0.7</b>
<b>D097</b>	tough	<b>0.7</b>
<b>D098</b>	not cheap received failure	<b>0.5</b>
<b>D099</b>	has a high fighting power	<b>0.4</b>
<b>D100</b>	optimistic	<b>0.9</b>

### 3. METHODS

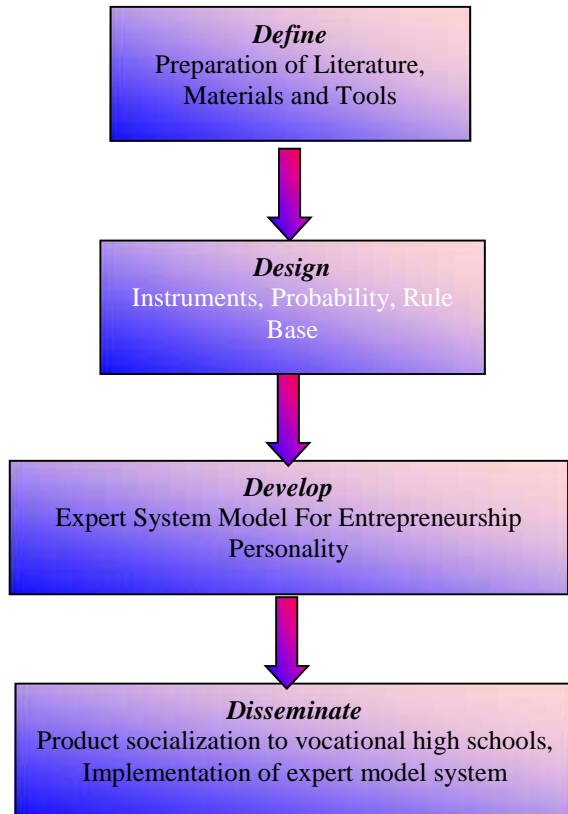


Fig.2 Research Methods using 4D Model

The research method used is 4 D model with 4 stages of development that is (Define, Design, Develop, Disseminate) in the first stage finds literature, materials and tools. the second stage of designing Instruments, determining the weight done by the expert, Rule Base, the third stage of developing the Expert System Model For Entrepreneurship Personality, the last stage of Product socialization to vocational high schools, Implementation of expert model system.

#### 3.1 Product View

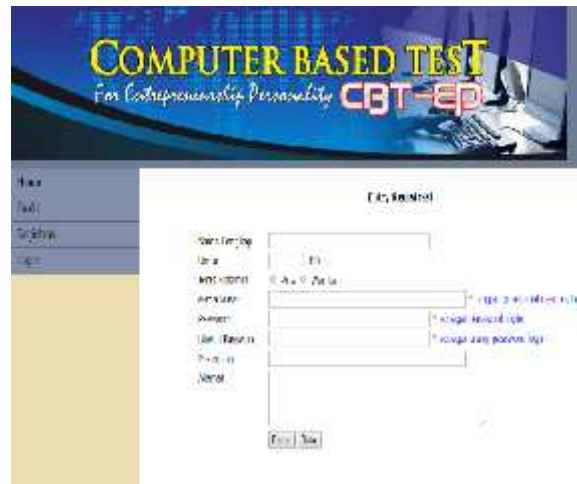


Fig. 3 Form registration

#### a. Participant Registration Form

Students must fill in the participants' data. After Charging, then click the save button, then the data will be stored in the database. After registering, the thing done is getting approval from the admin in order to do the next process.



Fig. 4 Form Login

#### b. Form Login

Before doing the test, participants are required to login to be able to do the test

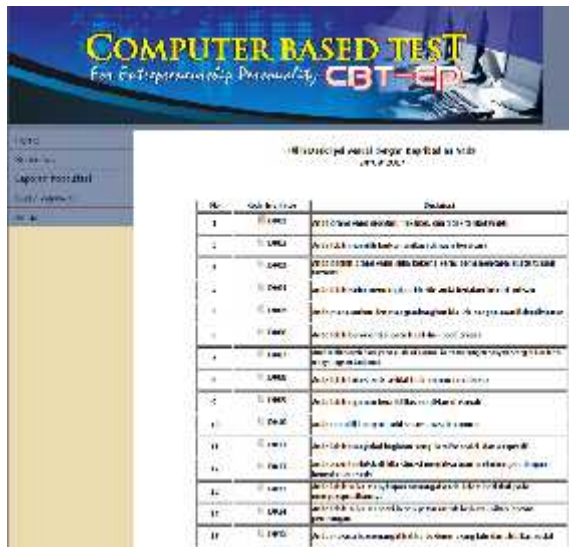


Fig. 5 Form Login

### c. Entrepreneurship Personality Test Form

Participants are required to fill in the code of participants who have been obtained after the first registration. After the participant code is filled then, will appear the name of participants, gender, selected courses and photos of test participants. In this personality test form comes a statement that has led to assess the personality of the participants towards Entrepreneurship. The answer to the statement given in the form of Likert scale that has the weight of each answer. The right answer according to the personality of Entrepreneurship will get a high score.

## 4. DISCUSSION

This expert system model has assisted vocational high school students in recognizing their entrepreneurship potential, and assisting students in directing their career to the field of entrepreneurship, besides this model also helps select students who have strong, medium and non-entrepreneurial personality is to facilitate the implementation of training, the efficiency of training costs and the provision of funds PKM more to the right people so that entrepreneurs-entrepreneurs who can potentially utilize the facilities that have been given the government in the right target

## 5. CONCLUSION

This model can be applied to Vocational High School students especially in the field of technological expertise. This model is a supplement of the existing model in order to be used in providing career referrals for an individual. This model is highly dependent on the readiness of technology, whether hardware (server, personal computer / laptop), Software (Operating system, and

web application) and internet network technology (bandwidth) adequate.

Application of this model is expected to optimize the use of technology resources, human resources and potential possessed by a vocational high school. The application of this model is able to make indirect media consultations that can be done anytime and anywhere without being limited by time and space. Through this model is expected to reduce the unemployment rate, especially for vocational high school graduates.

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