THE DESIGN OF DECISION SUPPORT SYSTEM FOR STUDENTS CANDIDATE IN CHOOSING MIDWIFERY DEPARTMENT AND MIDWIFERY ACADEMY OF STIKES

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Abstract: *Student candidates have difficulty in choosing Midwifery Department and Midwifery Academy of STIKES. Students that had already graduated from senior high school which eager to pursue to Midwifery Department of STIKES face uneasy problems because there are some considerations that should be taken into account such as tuition fee during education process, job opportunity, collaboration between campus and related institutions, length of study, facilities received by students and whether accreditation of Midwifery Department of STIKES is good or not. The objective in designing decision support system is to help students candidate in choosing data related to higher education of health. Results from validation test on decision support system for students candidate in selecting Midwifery Department of STIKES 1 were in form of ranking with quality value of 0.99 and D4 level with quality value of 1 that were most interested by students candidate. Prototype design of decision support system had produced recommendation for students candidate to choose Midwifery Department of STIKES.*

Keywords: *Decision support system, Midwifery Academy*

1. INTRODUCTION

Human life is always faced to several choices and the correct decision making will have profound effect on our life. The paper with title of "Decision support system in choosing department at tertiary educational institution for senior high school students by using AHP method" had showed that students that had already have references of department sometimes had selected departments which are not appropriate with their real talent and interest. Students sometimes inappropriate in choosing tertiary educational institution according to their interest and talent, especially in choosing Midwifery Department and Midwifery Academy of STIKES because the selection of health science field can not only based on consideration of students interest, but also on tuition fee during study period, accredititation status, laboratory facilties owned by the selected campus, campus location as well as infrastructures and structures of campus.

Problem of decision making is also experienced by students who want to pursue to higher education level. Many students candidate had difficulty to determine their choice whether to attend to Midwifery Department or Midwifery Academy of STIKES according to their capability and expertise during their study at Senior High School or Vocational School.

This research objective was to design the prototype of decision support system in choosing Midwifery Department of STIKES. The research limitations are as follows: 1) This research only used the criteria obtained from validation test results in form of questioners. 2) This research only used AHP method in selection process of Midwifery Department of STIKES. 3) This research only used 3 criteria and 2 alternatives in hierarchy structure. 4) Questioners used in this research was in form of questions about the selection of Midwifery Department of STIKES which consisted of 4 questions for each criteria. 5) The final result given by system is only ranking of Midwifery Department or Midwifery Academy of STIKES which are mostly interested by students candidate.

One of the method used in decision support system is analytical hierarchy process (AHP) which is used to conduct decision making in scientific and rational manners in order to give solution for complex criteria problem in several alternatives. AHP in this research is used to give alternative choices related to Midwifery Department or Midwifery Academy of STIKES which consisted problems between alternative and criteria that can be solved by using AHP which in turn produce optimal alternative choice of tertiary educational institution.

2. THEORETICAL BACKGROUND

The previous research entitle "Decision Support System with Analytical Hierarchy Process (AHP)" was used to solve a problem within organized thinking framework which can be expressed to make effective decision for a problem. This decision support system is made as decision support aid for user/students candidate in determining Midwifery Department of STIKES to be attended. (Norhikmah et al., 2014). The research entitle "The Best Employee Selection" was decision making problem using multi criteria (Multi Criteria Decision Making or MCDM). Decision support system for the best employee selection at PT "X" was developed by using several criteria such as SOP (Standard Operational Procedure), attitude and personality, consumer evaluation and evaluation from team work environment. The method used in this research was Fuzzy AHP"(Yullyanti, 2011). The research conducted by the writer is 'The Design of Decision Support System in Choosing Midwifery Department of STIKES' which is designed to help students candidate in choosing Midwifery Department of STIKES so that they are not regret in the future. The method used by the writer was AHP method that has 3 criteria related to cost, facility and quality as well as 2 alternatives which consisted of Midwifery Department and Midwifery Academy of STIKES.

3. THE RESEARCH METHOD

Research method is very important in a research activity because the decision or the conclusion should be made through this research. The method used by the writer is Analytical Hierarchy Process (AHP). AHP is a method which break the complex problem with unstructured situation into component parts, organize component parts or variable into hierarchy structure form, give numerical value for subjective evaluation toward relative importance of each variable, evaluation synthesize for variable which have the highest priority that will affect decision for the existing situation (Rustiyono et al., 2014). There are some important principles that should be understood in problem solving with AHP method as follows:

a. Hierarchy developmen
   The problem hierarchy is constructed to help decision making process by considering all decision elements involved within system. Hierarchy design of AHP was conducted by using hierarchy structure (Figure 1) (Astuti et al., 2011).

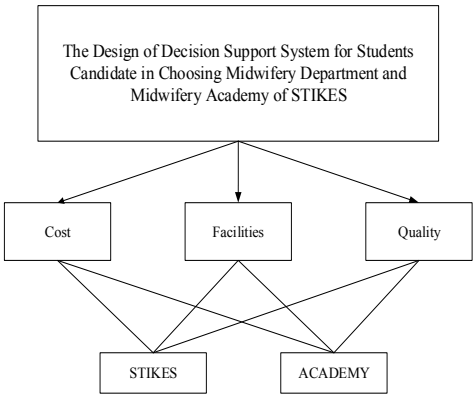

Figure 1 midwifery department development hierarchy
Source: Meidyan and Yayuk, 2016 data has not been published

b. Criteria and alternative evaluation
Criteria and alternative was done by using pair comparison for several problems and scale ranges from 1 to 9 are the best scale in expressing opinion (Asrina et al., 2013). Value and definition of qualitative opinion from comparison scale can be measured by using analysis table (Table 1).

Table 1 intensity paired camparison grading scale

Intensity of Importance	Explanation
1	Two activities contribute equally the objective
3	Experience and judgement slightly favour activity over another
5	Experiance and judgement strongly over another, its dominance demonstrated in practice
7	An activity is favoured very strongly over another, its dominance demostrated in practice
9	The evidence favouring one activity over another is of the highest possible order of affirmation
2,4,6,8	Sometimes one needs to interpolate a compromise judgement numerically because there is no good word to describe it

Source: Kusrini, 2007

c. The technique to measure consistency was available in AHP procedure. Formula used to calculate consistency index is (CI) = (λmaks- n) / (n)
where n = numbers of element.
d. The formula used in consistency ratio (CR) calculation is CR= CI/RC,
Where CR = Consistency Ratio
CI = Consistency Index
IR = Index of Random Consistency.

If consistency ratio (CI/CR) is less than or equal to 0.1, then calcuation result can be declared as correct.
DSS (Decision Suppport Sistem) is interactive information system which provide information, modeling and data manipulation. This system is used to help the decision making in semi structured situation and unstructured situation where no one know exactly how the decision should be made (Kartikadarma and Al Zami, 2011).

Flowchart is illustration in form of flow diagram from algorithms within a program which describe the flow direction of this program. Several symbols used to draw a flowchart are described in the following table (Pahlevy. 2010). This flowchart is used to provide system flow that will be made by the writer.

Data compilation technique conducted by the writer was as follows:

a. Questioner is data compilation technique which done by providing several questions or written statements that should be answered by respondents (Sugiyono, 2005). Questioner used by the writer is by giving questions which are obtained from survey in STIKES to students candidate.
b. Literatures review had been used in different terminologies by experts such as theoretical base, litrature review and theoretical study. The use of these terminologies basically is refer to general efforts that should be claimed in order to obtain theories which relevant with research topic (Koesnaedi, 2007). Literatures review conducted by the writer was to find literatures which related to the research.
Survey is used to obtain data from specific location which is natural (not man-made), but the writer had conducted the treatment in data compilation (Sugiono, 2010). Survey conducted by the writer was to collect data related to Midwifery Department and Midwifery Academy of STIKES.

4. RESULT AND DISCUSSION

The stages used in this research is stages according to AHP method. The stages of *Analytical Hierarchy Process* (AHP) are as follows:
In order to analyze a system, the writer used a case as follows: students will choose Midwifery Department of STIKES as their lecture site; students have reference A, B and C related to Midwifery Department of STIKES. Students will choose Midwifery Department of STIKES based on 3 criteria as follow:

1. Midwifery Department of STIKES with affordable tuition fee having parameters as follows:
   a. It is classified as expensive if the entrance fee is about Rp. 14,000,000 and tuition fee per semester is about Rp. 6,500,000.
   b. It is classified as medium if the entrance fee is about Rp. 9,500,000 and tuition fee per semester is about Rp. 5,000,000.
   c. It is classified as cheap if the entrance fee is nul and tuition fee per semester is about Rp. 3,500,000.
2. Midwifery department of STIKES has facilities with parameters as follows:
   a. It is classified as adequate if:
      - Has laboratory facilities where number of equipments is equal to number of students within one classroom.
      - Has building itself.
      - Has multi purpose room.
      - Has mushola (praying facility).
      - Has hotspot area.
      - Has library.
   b. It is classified as relatively adequate if :
      - Has laboratory facilities where number of equipments is less than number of students within one classroom.
      - Has building itself.
      - Has mushola (praying facility).
      - Has library.
   c. It is classified as inadequate if :
      - Has no laboratory.
      - Has building but not its owned property.
      - Has mushola (praying facility).
      - Has library.
3. The quality of midwifery department of STIKES with parameters as follows:
   a. Very good, if midwifery department of STIKES has accreditation value of A or B.
   b. Good, if midwifery department of STIKES has accreditation value of C.
   c. Poor, if midwifery department of STIKES has no accreditation or it only has permit status from Higher Education Council.

After the criteria was obtained, the next step was to solve the problem by using method which suitable to AHP procedure:

4. Priority determination from the selected criteria .
   a. Development of pair table comparison matrix.
      Values comparison amongst cost and cost, cost and facility, cost and quality, facility and quality (Table 2).

Table 2 development of pair table comparison matrix

	Cost	**Facilities**	**Quality**
Cost	1	1	2
Facilities	0,5	1	1
Quality	0,33	0,5	1
Amount	1,83	2,5	4

Source : Meidyan and Yayuk, 2016 data has been not published

b. Development of criteria value matrix
Summing up values to determine priority for each criteria (Table 3).

Table 3 criteria value matrix

	Cost	**Facilities**	**Quality**	**Amount**	**Priority**
Cost	0,546448087	0,4	0,5	1,446448	0,3052
Facilities	0,273224044	0,4	0,25	0,923224	0,1948
Quality	0,180327869	0,2	0,25	2,369672	0,5
Amount	1	1	1	4,739344	1

Source: Meidyan and Yayuk, 2016 data has been not published

c. Development of summing up matrix for each row.
Summing up each criteria (Table 4).

Tabel 4 matrik penjumlahan setiap baris

	Cost	**Facilities**	**Quality**	**Amount**	**Priority**
Cost	0,5464481	0,4	0,5	1,446448	0,3052
Facilities	0,273224	0,4	0,25	0,923224	0,1948
Quality	0,1803279	0,2	0,25	2,369672	0,5
Amount	1	1	1	4,739344	1

Source : Meidyan and Yayuk, 2016 data has been not published

d. Consistency ratio calculation
Consistency ratio calculation is used to make certain that consistency ratio value (CR) <= 0.1. If CR is higher than 0.1, then pair comparison matrix should be adjusted (Table 5.

Table 5 consistency ratio calculation

	Cost	**Facilities**	**Quality**	**Priority**	**Amount**	**Amount/ Priority**	**Lamda**	**C1**	**R1**	**Cr**
Cost	1	1	2	0,3052	1,220800184	4	2,776667	-0,11167	0,66	-0,16919
Facility	0,5	1	1	0,1948	0,486999885	2,5				
Quality	0,33	0,5	1	0,5	0,915	1,83				
	1,83	2,5	4	1						

Source : Meidyan and Yayuk, 2016 data has been not published

e. Final decision result
Final decision result for midwifery department of STIKES selection has criteria of expensive cost, sufficient facility and very good quality, whereas midwifery Academy of STIKES has criteria of medium cost, sufficient facility and good quality (Table 6).

Table 6 final decision result

	Cost	**Facility**	**Quality**
Stikes	expensive	good	Very good
Academy	good	good	good

Source: Meidyan and Yayuk, 2016 data has been not published

f. Decision final value
Decision final value is obtained from calculation of matrix result and decision final result based on calculation by using AHP method (Table 7).

Table 7 decision final value

	Cost	**Facility**	**Quality**	**Amount**
Stikes	0,282872	0,217128	0,5	1
Academy	0,173373161	0,217128	0,5	0,890501

Source: Meidyan and Yayuk, 2016 data has been not published

The results showed that students candidate prefers to choose midwifery department of STIKES with quality value 1 than that of midwifery academy of STIKES with quality value 0.89.

Flowchart System

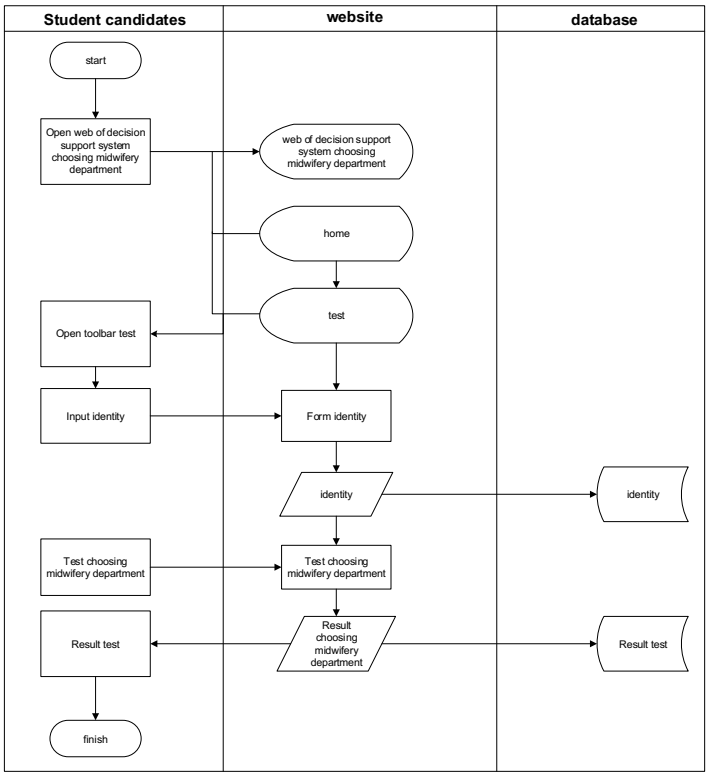

Figure 2 Flowchart System

Source: Meidyan and Yayuk, 2016 data has been not published

5. CONCLUSION

The results showed that SPK validation level by using AHP method in choosing midwifery department and midwifery academy of STIKES was very good. This was shown by SPK validation test results from manual calculation and calculation by using the developed system which had produced the same results. Samples test results showed that midwifery department of STIKES had total quality value of 1 and midwifery academy of STIKES had total quality value of 0.89 which means that students candidate had prefered to choose midwifery department of STIKES than that of midwifery academy of STIKES. This decision supporting system can help students candidate in choosing midwifery department and midwifery academy of STIKES.

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