

Implementation of the WASPAS Method in Selection Librarian FST UIN Sumatera Utara

Suendri
Program Studi Sistem Informasi
Universitas Islam Negeri Sumatera Utara
Medan, Indonesia
suendri@uinsu.ac.id

Anggika Wardani
Program Studi Sistem Informasi
Universitas Islam Negeri Sumatera Utara
Medan, Indonesia
anggikawardani@gmail.com

Abstract— The selection of prospective librarians is necessary to make the right decisions and determine the most suitable individual to meet the library's needs. However, in facing the complexity of changes in the information environment and technological developments, the FST library often needs help selecting prospective librarians using manual calculations, which can affect the effectiveness of the library head and staff in selecting. This research was conducted at the FST Library of the North Sumatra State Islamic University. This time, the researchers used the Weighted Aggregated Sum Product Assessment (WASPAS) method to select prospective librarians. The criteria used are communication skills (C1), mastery of technology (C2), customer service (C3), limited skills (C4), and lack of adaptability (C5). Then, the alternatives used were five samples of prospective librarians who registered at the FST library. The calculations using the WASPAS method showed that the alternative Nazla Maulida (A04) was a suitable candidate to become a librarian at the FST library with a total score of 0.854.

Keywords— Librarians, WASPAS, DSS

1. Introduction

In the current era of globalization and digitalization, libraries must have librarians who can think intelligently, creatively, and innovatively in responding to existing problems [1]. Libraries provide and store collections of books and library materials to be read, studied, and discussed for general or special audiences [2]. Librarians must be able to manage and integrate digital collections with physical collections efficiently and provide easy accessibility for users. Excellent service quality, such as superior service and good complaint handling, allows library managers to provide satisfaction to users. This satisfaction will create a positive image of the library and its librarians [3].

The large number of prospective librarians who want to register to become librarians at the Faculty of Science and Technology, North Sumatra State Islamic University, Medan, makes the head of the library experience difficulties, and it takes a long time to find the right candidate. The required candidates must have good communication skills, understand technology service skills, and understand library systematics.

A Decision Support System (DSS) is an information system that allows users to interact directly with the system, obtain relevant information, use available models, and process data to assist decision-making [4]. One of the SPK methods used is Weighted Aggregated Sum Product Assessment (WASPAS). The WASPAS method solves various problems, such as decision-making, alternative assessment, evaluation, and so on [5]. Compared to other methods, the advantage of this method is its ability to carry out assessments more precisely based on predetermined criteria values and preference weights. Also, WASPAS can select the best alternative from several existing alternatives because of the ranking process after determining the weight for each attribute [6].

2. Review the Literature

a. Decision Support Systems (DSS)

A Decision Support System (DSS) or Decision Support System (DSS) is an interactive information system that provides information, models, and data processing [7]. This system assists in making decisions quickly in semi-structured or unstructured situations where there is no clarity regarding how the decision should be made [8]. SPK is usually created to support solving a problem and assess an opportunity [9]. The SPK application is used for decision-making using CBIS (Computer Information System), which is flexible, interactive, and can be adjusted to support solutions to specific, unstructured management problems [10]. The decision support system is a system that cannot be separated from PC technology [11]. In general, the SPK plays a role in helping to gather decisions efficiently so that the cases experienced can quickly find a solution [12].

b. WASPAS

WASPAS is a method that can reduce errors or optimize the diagnosis for selecting the highest and lowest values [13]. WASPAS is one of the procedures used to minimize the badness of a result in searching for results to identify the highest and smallest numbers [14]. The stages of the WASPAS procedure consist of four steps, namely:

- 1) Determine the normalization decision matrix

The first step, the criterion values are converted to normalized form.

$$X_{ij} = \frac{X_{ij}}{\max X_{ij}} \text{ (benefit)..... (1)}$$

$$X_{ij} = \frac{\min X_{ij}}{X_{ij}} \text{ (cost) (2)}$$

Annotation:

- X = Normalized criterion values
- I = Shows the alternative i-th
- J = Indicate criteria j-th

- 2) Calculate the WSM value using the equation formula.

$$WSM = 0,5 * (\sum n X_{ij} * W_{ij}).....(3)$$

Annotation:

- X = normalized criteria value
- W = weight of the criteria
- i = Shows criteria i-th
- J = Shows criteria j-th

- 3) Calculating WPM using the equation formula

$$WPM = 0,5 * (\prod_n (X_{ij})W_j).....(4)$$

- 4) The Waspas value is a combination of WSM and WPM calculations.

c. The Role of the Librarian

The role is an assessment of the extent to which a person or part functions in supporting efforts to achieve set goals or a measure of the relationship between two variables, which is a cause-and-effect relationship. A librarian is a person who provides and carries out library activities to provide services to the community by the mission carried out by the parent institution, which is based on library knowledge, documentation,

and information obtained through education [15]. Improving the quality of library services is an important factor in attracting users' attention in using the library regularly. The ideal librarian can do this. To increase the professionalism of librarians, it is necessary to provide continuous education; this education can take the form of upgrading, workshops, and so on.

d. College Library

A college library is a library that is part of a higher education institution, whether in the form of a university library, faculty library, academic library, high school library, or research institute library within a college environment [16]. College libraries support the Tri Dharma of Higher Education: education, research, and community service. Libraries provide information sources and services the academic community needs to carry out their duties and functions.

3. Research methods

The R&D method is a research method used to produce products and test the effectiveness of these products [17]. The stages carried out in the Research and Development method begin with researching and analyzing the needs or problems to be researched[18], then preparing a research plan by formulating the problem, determining objectives, determining the boundaries of the problem, conducting literature studies, and carrying out data collection using certain techniques.

After the research stage, the next stage is developing a preliminary product form, namely developing a product according to the expected goals. After the product is produced, the testing process is carried out in stages, starting from the preliminary field testing stage, namely the initial trial stage. The main product revision is carried out if there are improvements. Next, a main test is carried out on the product, called the main field testing stage, and an operational product revision is carried out for broader product improvements so that the product can be validated through the operational product testing stage until the final product is produced.

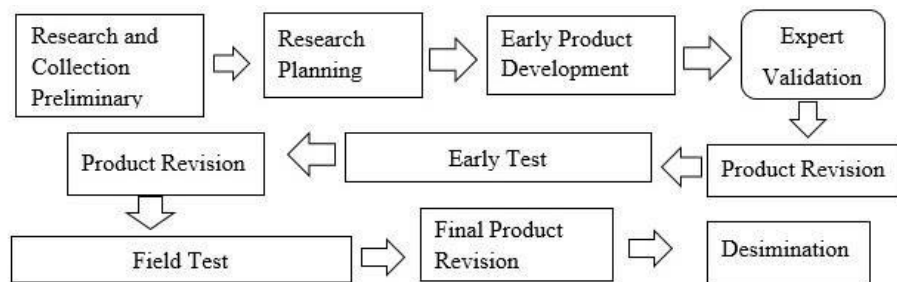


Figure 1. Research and Development (R&D)

4. Results and Discussion

a. Determine the type of criteria and categories

To start applying the WASPAS method in selecting FST UIN Sumatera Utara librarians, the initial calculation step starts with determining the criteria and attribute categories used as a reference in decision-making [19][20]. The criteria and categories are:

1. K1 (Criteria 1) is "Communication Ability" with the attribute category being "Benefit".
2. K2 (Criteria 2) is "Mastery of Technology" with the attribute category being "Benefit".

3. K3 (Criteria 3) is "Customer Service" with the attribute category being "Benefit".
 4. K4 (Criteria 4) is "Skill Limitations" with the attribute category being "Cost".
 5. K5 (Criteria 5) is "Lack of Adaptability" with the attribute category being "Cost".
- b. Determine the weight of each type of criterion. Here, the weight of the criteria that the author uses is : $W = (K1:0.25 ; K2:0.2 ; K3:0.3 ; K4:0.15 ; K5:0.1)$.
- c. Define objects or candidates (alternatives), as follows :
- 1) A1 = Candidate-A
 - 2) A2 = Candidate-B
 - 3) A3 = Candidate-C
 - 4) A4 = Candidate-D
 - 5) A5 = Candidate-E
- d. Providing an assessment index, the assessment level uses a value interval of 1 to 5, with the following details:
- 1) 5 = Very Good
 - 2) 4 = Good
 - 3) 3 = Fair
 - 4) 2 = Less
 - 5) 1 = Very Poor
- e. Create tables and decision matrices based on predetermined criteria and alternative data, as follows:

Table 1. Alternative Data

Category		Benefit	Benefit	Benefit	Benefit	Benefit
Weight		0,25	0,02	0,3	0,15	0,1
No	Alternative	K1	K2	K3	K4	K5
1	A1	4	2	2	2	2
2	A2	2	3	5	2	2
3	A3	2	3	4	1	1
4	A4	5	4	4	2	1
5	A5	4	3	3	1	2

Generating a Decision Matrix:

$$X = \begin{bmatrix} 4 & 2 & 2 & 2 & 2 \\ 2 & 3 & 5 & 2 & 2 \\ 2 & 3 & 4 & 1 & 1 \\ 5 & 4 & 4 & 2 & 1 \\ 4 & 3 & 3 & 1 & 2 \end{bmatrix}$$

- f. Carrying out Normalization
- 1) Weighted calculation

$$W = (0.25, 0.2, 0.3, 0.15, 0.1)$$

So the weight normalization calculation is:

$$W1 = 0.25 / (0.25 + 0.2 + 0.3 + 0.15 + 0.1) = 0.25$$

$$W2 = 0.2 / (0.25 + 0.2 + 0.3 + 0.15 + 0.1) = 0.2$$

$$W3 = 0.3 / (0.25 + 0.2 + 0.3 + 0.15 + 0.1) = 0.3$$

$$W4 = 0.15 / (0.25 + 0.2 + 0.3 + 0.15 + 0.1) = 0.15$$

$$W5 = 0.1 / (0.25 + 0.2 + 0.3 + 0.15 + 0.1) = 0.1$$

2) Calculation of Benefit and Cost criteria

If the criteria are worth the benefit : $X_{ij} = \frac{X_{ij}}{\text{Max}_i X_{ij}}$

If the criteria is worth the cost : $X_{ij} = \frac{\text{Min}_i X_{ij}}{X_{ij}}$

Table 2. Weight Calculation

No	Category	Benefit	Benefit	Benefit	Cost	Cost
		Weight	K1	K2	K3	K4
	Alternative	Communi- cation Skills	Mastery of Technology	Customer service	Skill Limitations	Lack of Adaptabil- y
1	Candidate-A	0.8	0.5	0.4	0.5	0.5
2	Candidate-B	0.4	0.75	1	0.5	0.5
3	Candidate-C	0.4	0.75	0.8	1	1
4	Candidate-D	1	1	0.8	0.5	1
5	Candidate-E	0.8	0.75	0.6	1	0.5

3) Calculating the final value (Q), and ranking from the normalization results:

Final score / Quality index (Qi) : $Q_i = 0,5 \sum_{j=1}^n X_{ij}w + 0,5 \prod_{j=1}^n (x_{ij})^{w_j}$

Table 3. Final Score and Ranking

NO	Alternative	Weight Sum Model (WSM)	Weight Product Model (WPM)	Value Quality (Qi)	Rank
1	Candidate-D	0.865	0.843	0.854	1
2	Candidate-E	0.74	0.715	0.722	2
3	Candidate-C	0.73	0.702	0.721	3
4	Candidate-B	0.675	0.631	0.653	4
5	Candidate-A	0.545	0.526	0.535	5

From the calculation results, Candidate-D was selected as an alternative selected librarian candidate with a utility value (Qi) of 0.854.

Conclusion

Based on the results of the research that has been carried out, each weight value obtained from the selection criteria for the selection of librarians for the FST UIN Sumatera Utara library is the weight of communication skills 0.25, the weight of mastery of technology 0.2, the weight of customer service 0.3, the weight of limited skills 0, 15, the weight of lack of adaptability 0.1. The results obtained from using the WASPAS

method for selecting librarians for the FST UIN Sumatera Utara library were based on five criteria: communication skills, mastery of technology, customer service, limited skills, and lack of adaptability. So, candidates for FST UIN Sumatera Utara library librarians will be selected based on these five criteria. Based on the overall results of the calculations, the alternative with code A4 or Candidate-D has the highest value, namely 0.854.

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