A Model of the Best Private University Selection in Aceh

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Abstract. The Integrated Population Decision Support Model in the village needs to be developed according to the rules of Law number 6 of 2014 with a decision information system model that can assist one in making accurate and targeted decisions in choosing a university. Many problems can be solved using a model, one of which is the Decision Making System, for the Determination of Human Resources in an area. There are several models that have been built including Analytical Hierarchy Process (AHP), which is the most widely used research method in solving multi-criteria problems, such as in the Determination of Human Resource Selection. This research model uses Analytical Hierarchy Process (AHP) in determining the University for a superior place of learning for human resources. In determining the University, there are several basic decision-making, including the place of the educational model, the model of expertise / skills taught, reputation, quality, teaching and learning process. The final results in this study are the priority results of university criteria, which are sorted from highest to lowest, so that prospective student users who wish to continue their higher education in choosing a regional university (rural) can easily make decisions by determining the university in the village which, and finally this model is almost 80% accurate.

Keywords: Model, Analytical Hierarchy Process, University

1. Introduction

The countryside has always been a dream of every human being for a place to live because it is cool and can breathe free and fresh air, and free from noise, therefore every individual in the village needs a reliable / good place to study. Our country has many private developing universities. Unlike state universities, private universities are more established, which makes us confused to determine which is the best private university in rural areas in an area, so the object of research is in one of the provinces in Aceh, because it has a specialty in managing government administration. Therefore this research is thinking carefully in order to be the best decision and it is not wrong in determining the choice to continue to a higher education level, namely the University in the village.

The problem that many of us find now in a university is that it is not accredited, costs soar, lecturers are not reliable so that later they will graduate graduates who are not qualified. The consequence that will arise is the name of the university that is not good because it is not able to produce qualified skilled graduates. In determining the best university, information about the university's reputation, university accreditation, departmental, financial and output accreditation is needed in a private university.

In the mandate of law No. 6 of 2014 concerning Villages, must strive to develop independence and prosperity of the community by increasing knowledge, attitudes, skills, behavior, abilities, awareness, and utilizing resources through the determination of policies, programs, activities and assistance in accordance with the essence of the problems and priority needs of rural communities, then the village community should take an active stance to prepare everything related to the implementation of the Act - the village, one of which is about information systems choosing private universities in rural areas that aim to open information on the implementation of good and reliable governance to the public to make a choice.
2. Research Methodology

Research methodology used in solving problems:

1. Library Studies
   At this stage the literature study is carried out, namely collecting reference materials from books, articles, journals, papers, and on the internet in making applications in the field.

2. Data Collection
   At this stage the data were collected in the form of data about the data of Private Universities in Aceh.

3. Problem Analysis
   At this stage an analysis will be made of the application of the selection of the best private tertiary institution in the Aceh countryside.

4. The system is tested
   At this stage the results of the analysis of the solution to the solution in the application of the selection of the best private universities and the design of the application resulting in an easy-to-use interface for determining the best university.

3. Results And Discussion

3.1 Pairwise comparison weight.

Pairwise comparisons are carried out based on the rules for assessing the weight of criteria in the following table 1:

| Level of importance | Definition                                                                 |
|---------------------|-----------------------------------------------------------------------------|
| 1                   | Both elements are very important                                           |
| 3                   | One element is a little more important than the other elements              |
| 5                   | One element of the essence of the tool is very important compared to the other elements |
|                     | One element is really more important than the other                        |
| 7                   | The absolute element is more important than the other elements              |
| 9                   | Middle values between two consecutive assessments                         |
| 2,4,6,8             |                                                                             |

3.2 Pairwise Comparison Matrix

Pairwise comparison matrix is conducted for comparison assessment between one criterion with other criteria, namely Reputation criteria with accreditation criteria, reputation criteria with lecturer quality criteria, reputation criteria with learning process criteria, reputation criteria with facilities, quality accreditation lecturers, accreditation criteria with learning process, accreditation criteria with facilities, lecturer quality criteria with learning process, criteria for learning process with facilities. The results of the assessment are in table 2.
Table 2: Making Criteria Comparison Matrix

| Goal     | Reputation | Accreditation | Lecturer Quality | Learning Process | Amenities |
|----------|------------|---------------|------------------|------------------|-----------|
| Reputation | 1          | 3             | 5                | 7                | 9         |
| Accreditation | 0.333333   | 1             | 3                | 5                | 7         |
| Lecturer Quality | 0.2        | 0.333333     | 1                | 3                | 5         |
| Learning Process | 0.142857   | 0.2           | 0.333333333      | 1                | 3         |
| Amenities   | 0.111111   | 0.142857     | 0.2              | 0.333333333      | 1         |
| Total       | 1.787302   | 4.67619      | 9.533333333      | 16,33333333      | 25        |

After entering the data in table 2 above, the division value of the number of columns is divided by the number of each column and sums the element values of each column. From the values of the criteria matrix elements above, the number of elements in each column are:

- Number of Column 1: 1 + 0.333333 + 0.2 + 0.142857 + 0.111111 = 1.787302
- The number of Column 2: 3 + 1 + 0.333333 + 0.2 + 0.142857 = 4.67619
- Number of Column 3: 5 + 3 + 1 + 0.333333333 + 0.2 = 9.533333333
- Amount of Column 4: 7 + 5 + 3 + 1 + 0.333333333 = 16,33333333
- Number of columns 5: 9 + 7 + 5 + 3 + 1 = 25

3.3 Criteria Value Matrix

Consideration of consideration for pairwise comparisons is synthesized to obtain overall priorities. The things done in this step are:

1. Add the values of each matrix column
2. Divide each value from the column by the corresponding column to obtain the normalization of the matrix.
3. Add the values of each row and divide them by the number of elements to get the average value.

Table 3: Criteria value matrix

| Reputation | Accreditation | Lecturer Quality | Learning Process | Amenities | Sum       | Priority vector |
|------------|---------------|------------------|------------------|-----------|-----------|-----------------|
| 0.559503   | 0.641548      | 0.524475524      | 0.428571429      | 0.36      | 2.514097  | 0.502819496     |
| 0.186501   | 0.213849      | 0.314685315      | 0.306122449      | 0.28      | 1.301158  | 0.260231588     |
| 0.111901   | 0.071283      | 0.104895105      | 0.183673469      | 0.2       | 0.671752  | 0.134350441     |
| 0.079929   | 0.04277       | 0.034965035      | 0.06122449       | 0.12      | 0.338888  | 0.067777667     |
| 0.062167   | 0.03055       | 0.020979021      | 0.020408163      | 0.04      | 0.174104  | 0.034820809     |

In this matrix Reputation column and reputation row 0.559503 are obtained from the reputation row reputation column value divided by the number row value and reputation column in table 2, this process is done until the quality row quality column. While the amount is the sum of 0.559503 + 0.641548 + 0.524475524 + 0.428571429 + 0.36 = 2.5140907. For the values in the priority column obtained from the values in the column number divided by the number of criteria, in this study there are 5 criteria.

3.4 The Sum of Each Line Matrix

The summing matrix of each row is obtained from the multiplication of priority values in table 3 with a paired comparison matrix in table 2.
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Value of 0.502819 on line Reputation of reputation column is obtained from the highest priority value available in table 3, multiplied by reputation row reputation value in table 2. The value of 0.167606 in the reputation column accreditation line is obtained from the highest priority value in table 3 multiplied by the value of the accreditation column of the reputation column in table 2, and so on until the facility line and facility column. While the number column in table 4 is obtained by summing the values on each row in the table. Like 2.743097 in the column number is the sum of 0.502819 + 0.780694763 + 0.671752203 + 0.474443668 + 0.313387281. n (number of criteria) = 5. Random Index (IR) = 1.12. Calculate max λ (number / n) = 26.2130459 / 5 = 5.242606918. CI ((λ max - n) / n) = 5.242606918 - 5 / 5 - 1 = 0.0606517295. CR (CI / IR) = 0.0606517295 / 1.12 = 0.0541533299. From the above calculation, produce a CR value of <0.1, so that the calculation of the consistency ratio can be accepted. For the calculation of the sub-criteria of each criterion carried out in the same way.

3.5 Alternative Comparative Matrix based on University Reputation criteria

Pairwise comparison matrices are conducted for the comparison of one alternative with another based on criteria. For alternative comparisons based on reputation criteria can be seen in table 5.

| Table 5: Alternative pairing matrix based on University Reputation criteria |
| --- |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 7 |
| 1 | Alternatif | Alternatif | Alternatif | Alternatif | Alternatif | Alternatif | Alternatif | Alternatif |
| 2 | Alternatif | 0.1 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| 3 | Alternatif | 0.2 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 |
| 4 | Alternatif | 0.2 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 |
| 5 | Alternatif | 0.2 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 |
| 6 | Alternatif | 0.2 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 |
| 7 | Alternatif | 0.2 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 |
| Total | 3.76055 | 7.51085 | 7.51085 | 11.5071 | 11.5071 | 15.67819 | 18.84228 | 21.01426 |

After determining the alternative comparison matrix value based on reputation criteria, the next is to calculate the priority vector value in the same way as calculating the priority vector criteria in table . Priority vectors for alternative matrices based on reputation criteria can be seen in table.
3.6 Vector Priority Ranking

The calculation steps for the Overall Composite Weight are as follows:
1. The weight column is taken from the Priority Vector column and the criteria matrix.
2. The other eleven columns (alternative campus names) are taken from the Priority Vector column, the five criteria matrix are Reputation, Accreditation, Quality of Lecturers, Learning Process and Facilities.
3. The Composite Weight line is obtained from the number of cell multiplication results above with Weight

### Table 7: Priority Vector Ranking Results

| Criteria          | Reputation | Accreditation | Learning Process | Lecturer Quality | Amenities | Results |
|-------------------|------------|---------------|------------------|------------------|-----------|---------|
| Almuslim          | 0.26532    | 0.028571      | 0.033333         | 0.02564          | 0.0222    | 0.14783 |
| Jabal Ghafur      | 0.13266    | 0.085714      | 0.066667         | 0.05128          | 0.0444    | 0.10299 |
| Iskandar Muda     | 0.13266    | 0.085714      | 0.066667         | 0.05128          | 0.0444    | 0.10299 |
| Abulyatama        | 0.08844    | 0.057143      | 0.1               | 0.07692          | 0.0667    | 0.08031 |
| Muhammadiyah Aceh| 0.08844    | 0.057143      | 0.1               | 0.07692          | 0.0667    | 0.08031 |
| Serambi Mekkah    | 0.06633    | 0.114286      | 0.066667         | 0.05128          | 0.0889    | 0.07862 |
| Teuku Umar Meulaboh| 0.05306   | 0.142857      | 0.066667         | 0.10256          | 0.1111    | 0.08363 |
| Gajah Putih       | 0.05306    | 0.057143      | 0.1               | 0.10256          | 0.1111    | 0.06581 |
| Gunung Leuser     | 0.04422    | 0.085714      | 0.133333         | 0.12821          | 0.1333    | 0.07579 |
| Ubudiyah Indonesia| 0.0379     | 0.142857      | 0.166667         | 0.15385          | 0.1556    | 0.09447 |
| Sains Cut Nyak Dhien| 0.0379    | 0.142857      | 0.1               | 0.17949          | 0.1556    | 0.08725 |
| **Weight**        | **0.5028195**| **0.2602316**| **0.1343504**    | **0.0677777**    | **0.0348208**|         |

Based on the table above, a decision can be made that those who have the highest score are Almuslim, which is 0.14783. Finally, it can be concluded that the Best Private University in Aceh is the University of Almuslim.
3.7 Display Admin Login

This page is used for data security. Admin who will use the system must login first by filling in the username and password according to the conditions of the system. Inputting data from the login form must match. If it does not match, the system will not respond and cannot proceed to the following menu. The admin login format can be seen in the following picture:

3.8 Page Analysis with AHP Method

This page is a page where the user determines the best university by choosing a comparison of values between criteria1 and criteria 2 so as to provide reports in the form of ranking or ranking of the best universities. The appearance can be seen in the following picture:

![Figure 1: Page Views Analysis with AHP Method](image1)

3.9 Admin page view

This page is the scope of all forms that are in the Admin login system, including alternative menu, criteria menu, alternative-criteria menu, change password menu and exit menu. This page can also be used to add, edit, and delete all data in the system. The appearance can be seen in the picture below.

![Figure 2: Admin Page Display](image2)

This page can also be used to add, edit, and delete item data. The appearance can be seen in the picture below.
4. Conclusion

The use of the AHP method in this application can solve problems from 11 University objects and 5 criteria, resulting in input into the decision making process of determining the best private university in Aceh. This decision support application provides user convenience in getting advice on the best private universities in Aceh. So that prospective students can determine the best university.

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[15] Pros and cons Source: Introducing Deep Learning with Matlab (Mathworks, 2018) Summary • Artificial intelligence has been used in so many applications. Practically, we are surrounded by AI technologies, in so many forms. • Machine learning is a sub-field of AI that focuses on giving ability to a computer to learn from data without explicitly being programmed by a human. • Deep-learning is a new form of neural network research. It is now the most popular algorithm of machine learning technology used in various companies.