

DETERMINATION OF KIP KULIAH SCHOLARSHIP RECIPIENTS THROUGH PROFILE MATCHING APPROACH AT ROYAL UNIVERSITY

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Abstrak: Royal University, located in Kisaran City, North Sumatra, is one of the institutions receiving KIP Scholarship allocations from LLDIKTI Region 1. However, the selection process for scholarship recipients is still conducted manually, making it prone to bias and inaccuracies. This study aims to develop a Decision Support System (DSS) using the Profile Matching method to optimize the recipient selection process. The system evaluates candidates based on five criteria: income, dependents, social status, academic achievement, and housing status. The Profile Matching method calculates gaps between candidate profiles and ideal criteria, assigning weighted scores for ranking. The results show that the system successfully automates and enhances the accuracy, efficiency, and transparency of recipient selection. The final ranking aligns with manual calculations, confirming the system's reliability. Putri Alya Ramadhani was ranked as the most eligible recipient. The implementation of this system significantly reduces human error and subjectivity, ensuring that scholarships are awarded to truly deserving students. This research demonstrates that a DSS based on Profile Matching can serve as an effective solution for fair and efficient scholarship distribution at Royal University.

Keywords: KIP scholarship; profile matching; decision support system.

Abstrak : Universitas Royal, yang berlokasi di Kota Kisaran, Sumatera Utara, merupakan salah satu perguruan tinggi yang menerima alokasi beasiswa KIP Kuliah dari LLDIKTI Wilayah 1. Namun, proses seleksi penerima beasiswa masih dilakukan secara manual, sehingga rentan terhadap bias dan ketidaktepatan. Penelitian ini bertujuan untuk mengembangkan Sistem Pendukung Keputusan (SPK) berbasis metode Profile Matching guna mengoptimalkan proses seleksi penerima. Sistem ini menilai kandidat berdasarkan lima kriteria utama: penghasilan, tanggungan, status sosial, prestasi akademik, dan status rumah. Metode Profile Matching menghitung selisih antara profil kandidat dengan kriteria ideal, lalu memberikan bobot untuk menentukan peringkat. Hasil penelitian menunjukkan bahwa sistem ini mampu mengotomatisasi serta meningkatkan akurasi, efisiensi, dan transparansi dalam seleksi penerima beasiswa. Hasil perbandingan sistem sejalan dengan perhitungan manual, yang membuktikan keandalannya, dengan Putri Alya Ramadhani sebagai kandidat terbaik. Implementasi sistem ini secara signifikan mengurangi kesalahan manusia dan subjektivitas, sehingga memastikan beasiswa diberikan kepada mahasiswa yang benar-benar berhak. Penelitian ini membuktikan bahwa SPK berbasis Profile Matching dapat menjadi solusi yang efektif dalam distribusi beasiswa yang lebih adil dan efisien di Universitas Royal.

Kata Kunci: beasiswa kip kuliah; profile matching; sistem pendukung keputusan.

INTRODUCTION

Education is a key element in improving the quality of a country's human resources, one of the important factors in human and social development is education. (Legi et al., 2023). Education is also a process of humanism which is known as the term humanizing humans. (Pratama, Sanjaya, & Shofia, 2022). However, not all people have the same opportunity to access higher education, especially due to economic limitations. To overcome this challenge, the Indonesian government launched the Kartu Indonesia Pintar Kuliah (KIP Kuliah) program, which aims to provide educational assistance to students from underprivileged families, where this program provides freedom in tuition fees and is given living expenses from the government. (Rini, Muhyidin, & Atikah, 2024). The KIP Kuliah program was launched with the aim of providing wider opportunities for children from lower economic strata of society to be able to access higher education more easily. (Rini et al., 2024) This program is expected to ensure that students from underprivileged families can continue their higher education.

Royal University, located in Kisaran City, Asahan Regency, North Sumatra Province, is one of the universities that receives KIP Kuliah allocation from LLDIKTI Region 1 North Sumatra. However, the selection process for recipients of the KIP Kuliah program at Royal University is still carried out manually. This method has weaknesses because it is prone to subjectivity and human error, which can ultimately lead to inaccuracy in determining recipients of assistance. This risks reducing the effectiveness of the program in achieving its main objectives. For this reason, a system is needed that can assist in processing recipient data with a Decision Support System (DSS).

Decision Support System can be defined as a system intended to support managerial decision makers in unstructured decision situations (Nasyuha et al., 2022) (Maria & Junirianto, 2021). In this study, the appropriate method to use is profile matching, which is able to match the profile of prospective recipients with the ideal criteria that have been determined. These criteria include income, academic achievement, social status, home status, and dependents. This system is designed using web-

based technology with the PHP programming language and MySQL database. Research using the profile matching method has previously been conducted by (Saputa Mandopa, 2022) with the title "Implementation of the Profile Matching Method to Determine Scholarship Recipients" but in this study still uses manual calculations and is not systematic, from this study the author then makes an update in the form of creating a Decision Support System for KIP Kuliah scholarship recipients based on the profile matching method where this study aims to minimize the error rate of scholarship recipients and is expected to make it easier for KIP Kuliah managers to determine KIP Kuliah scholarship recipients at Royal University.

METHOD

1. Research Stages

To achieve optimal results in this research, a series of well-structured and well-planned stages were carried out. (Efendi et al., n.d.).

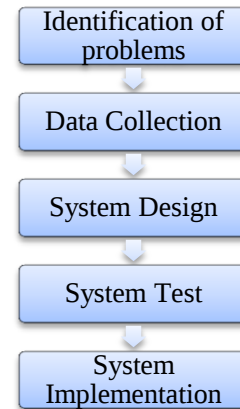


Image 1. Research Framework

a. Identification of Problems

The process of determining KIP Kuliah scholarship recipients at Royal University still faces obstacles, such as lack of objectivity, transparency, and efficiency. With so many applicants, it is difficult to determine priorities based on criteria such as income, academic achievement, social status, housing status, and family dependents. The existing selection method is not optimal for comparing candidate profiles as a whole, so it is necessary to apply the profile matching method so that the selection is more systematic, fair, and accurate.

b. Data Collection

The data in this study were obtained directly from the Royal University through a collection process that was in accordance with the research needs. After the data was collected, the researcher analyzed it thoroughly to understand the relevant patterns and relationships. The results of this analysis were then processed into more structured and easily understood information. This information is used as a basis for decision making and research conclusions, resulting in accurate and accountable results.

c. System Design

The system design process begins with creating UML,. Next, the preparation of the software to be used is carried out, namely Visual Studio, XAMPP, and MySQL database.

d. System Test

The system design process begins with creating UML, Next, the preparation of the software to be used is carried out, namely Visual Studio, XAMPP, and MySQL database.

e. Implementation System

The system procedure implemented is a series of steps taken to realize the agreed system design. Each step is designed to ensure that the system functions properly, in accordance with predetermined needs, and can be operated effectively by users. In addition, user training and post-implementation evaluations are also often carried out to ensure smooth operations and identify potential improvements in the future. Through this stage, the comparison of effectiveness values before using profile matching and using the profile matching method is also known.

2. Metode Profile Matching

The applied research is in the form of designing a decision support system for KIP scholarship recipients at Royal University using the profile matching method. Profile Matching is a decision-making method where applicants must meet the ideal prediction variable value, not the minimum value that must be met. (Diana, Achadiani, & Irawan, 2021) (Amin, Nurcahyo, & Yunus, 2024) . The profile matching method is one of the simple methods used in decision support systems.

To understand GAP analysis, a GAP weight value table is required. This analysis refers to the concept of a priority scale, where GAP weighting uses a range of values 0-5 according to the priority level of each criterion. The following is a problem-solving procedure using the profile matching method:

a. Determine The Criteria

The first stage in the profile matching method is to determine the criteria consisting of income, academic achievement, social status, housing status, and dependents..

b. GAP Mapping Calculation

After the weights are assigned to each criterion, the next step is to calculate the GAP mapping. GAP mapping is used to assess the extent of the difference between the profile of the prospective recipient and the desired standard for each criterion. The GAP calculation formula can be explained as follows: Melakukan pembobotan

After the GAP for each criterion is calculated, the next step is to assign weights. The weights of the GAP values listed in Table 1 are determined by the Profile Matching method.

Table 1. GAP Value Weight Profile Matching Method

Number	Different	Weight Value	Information
1	0	5	Competencies as needed
2	1	4.5	Location competence excess 1 level
3	-1	4	Location competency lacking 1 level/level
4	2	3.5	Location competency level 2/superior level
5	-2	3	Short location competency 2 level/level
6	3	2.5	Superior location competence 3 levels
7	-3	2	Location competency lacking at 3 levels
8	4	1.5	Location competence is superior by 4 levels
9	-4	1	In short, there are 4 levels of location competency

c. Calculation of Core Factor and Secondary Factor

After the GAP weight is obtained, the next step is to calculate the core factor and secondary factor. This calculation can be explained by the following equation:

Core factor

Core factor is the most important aspect. Where to calculate the core factor using the formula:

$$NCF = \frac{\sum NC}{\sum IC} \quad (2)$$

Description:

NCF : Average value core factor

$\sum NC$: Total value amount core factor

$\sum IC$: Total of items core factor

Secondary factor

Secondary factors are supporting factors and use the formula:

$$NSF = \frac{\sum NS}{\sum IS} \quad (3)$$

Description:

NSF : Average value secondary factor

$\sum NS$: Total value amount secondary factor

$\sum IS$: Total of items secondary factor

d. Total Score Calculation and Ranking

To calculate the total score, it is necessary to combine the scores from the core factor and secondary factors. The final score for each aspect is calculated using the following formula:

$$N = (X)\% \cdot NCF + (X)\% \cdot NSF \quad (4)$$

Description:

N : total value of the aspect

NCF : average value of core factor

NSF : average value of secondary factor

x and y : inputted percentage values.

RESULT AND DISCUSSION

The results and discussion include analysis of data that has been processed using the Profile Matching method through several initial stages, namely determining the criteria as in table 2 beside:

Table 2. Assessment Criteria

Numbe	Criteria	Criteria Code
1	Income	C1
2	Dependents	C2
3	Social Status	C3
4	Academic Achievement	C4
5	House's Status	C5

Selanjutnya menentukan nilai bobot kriteria seperti pada tabel 3 berikut :

Tabel 3. Bobot Kriteria

Criteria	Sub Criteria	Bobot
Income	$\geq 3.000.000$	1
	$< 3.000.000$, $> 1.000.000$	2
	$\leq 1.000.000$	3
Dependents	1 People	1
	2 People	2
	≥ 3 People	3
Social Status	Not Yet Recorded	1
	$\geq$ Desil 4	2
	Desil 1, 2, dan 3	3
Academic Achievement	No Achievement	1
	District Level	2
	Provincial Level	3
	National Level	4
	International Level	5
House's Status	Alone	1
	hitchhiking	2
	Annual Rent	3

Setelah kriteria dan bobot kriteria sudah ditentukan maka langkah selanjutnya adalah menentukan nilai target kritea. Adapun nilai target kriteria seperti pada tabel 4 berikut :

Table 4. Target Value

kode	name criteria	assessmen criteria	%	target value
C1	income	Core factor	60	3
C2	dependents			3
C3	social status			3
C4	academic achievement	Secondary Factor	40	5
C5	house's status			3

After determining the target value, the next step is to find the GAP mapping calculation where previously each sub-criterion already had a weight which can be seen in the following table 5:

Table 5. Alternative Weight Value

No	Alternative	Criteria				
		C 1	C 2	C 3	C 4	C 5
1	Isnaini Dewi	2	3	2	1	1
2	Nayla Dzarifah Ramadhanty	2	3	2	1	1
3	Maya Rani	2	3	1	2	1
4	Febri Dwi Yuspratika	2	3	3	1	1
5	Diana Sabila Samosir	2	2	2	1	1
6	Widi Nazraini	2	2	2	3	1
7	Rahmawati	2	3	3	1	3
8	Ukhti Raini	2	3	2	1	1
...		...	...	...	...	...
28	Eva Susanti	3	3	3	1	2
29	Riska Adha Lubis	2	3	2	1	1
30	Ismailda Chelseana	2	3	3	2	2

Next, a GAP search and GAP value weighting are carried out in table 6:

Tabel 6. Mencari Nilai GAP

No	Alternatif	Kriteria				
		C 1	C 2	C 3	C 4	C 5
1	Isnaini Dewi	2	3	2	1	1
2	Nayla Dzarifah Ramadhanty	2	3	2	1	1
3	Maya Rani	2	3	1	2	1
4	Febri Dwi Yuspratika	2	3	3	1	1
5	Diana Sabila	2	2	2	1	1

No	Alternatif	Kriteria				
		C 1	C 2	C 3	C 4	C 5
	Samosir					
6	Widi Nazraini	2	2	2	3	1
7	Rahmawati	2	3	3	1	3
8	Ukhti Raini	2	3	2	1	1
...		...	...	...	...	...
28	Eva Susanti	3	3	3	1	2
29	Riska Adha Lubis	2	3	2	1	1
30	Ismailda Chelseana	2	3	3	2	2
TARGET VALUE		3	3	3	2	3
1	Isnaini Dewi	-1	0	-1	-4	-2
2	Nayla Dzarifah Ramadhanty	-1	0	-1	-4	-2
3	Maya Rani	-1	0	-2	-3	-2
4	Febri Dwi Yuspratika	-1	0	0	-4	-2
5	Diana Sabila Samosir	-1	-1	-1	-4	-2
6	Widi Nazraini	-1	-1	-1	-2	-2
7	Rahmawati	-1	0	0	-4	0
8	Ukhti Raini	-1	0	-1	-4	-2
...		...	...	...	...	...
29	Riska Adha Lubis	-1	0	-1	-4	-2
30	Ismailda Chelseana	-1	0	0	-3	-1

After obtaining the GAP for each criterion, the next step is to give a weight value to each GAP, referring to table 1. The results of the GAP value weighting will be obtained in table 7 below:

Table 7. GAP Value Weighting Profile Matching Method

No	Alternative	Core Factor (60%)			Secondary Factor (40%)	
		Criteria				
		C1	C2	C3	C4	C5
1	Isnaini Dewi	4	5	4	1	3
2	Nayla Dzarifah Ramadhanty	4	5	4	1	3
3	Maya Rani	4	5	3	2	3
4	Febri Dwi Yuspratika	4	5	5	1	3
5	Diana Sabila Samosir	4	4	4	1	3
6	Widi Nazraini	4	4	4	3	3
7	Rahmawati	4	5	5	1	5
8	Ukhti Raini	4	5	4	1	3
9	Nisyia Azzahra	4	3	5	1	4
10	Suhabil Alfajri	4	5	5	2	4
...		...	...	...	...	...
...		...	...	...	...	...
28	Eva Susanti	5	5	5	1	4
29	Riska Adha Lubis	4	5	4	1	3
30	Ismailda Chelseana	4	5	5	2	4

Next, a search is carried out for the core factor and secondary factor values to obtain the values in table 8 below:

Table 8. GAP Value Weighting Profile Matching Method

No	Alternative	Core	Secondary	Total
1	Isnaini Dewi	4,3	2	3,4
2	Nayla Dzarifah	4,3	2	3,4
3	Maya Rani	4,0	2,5	3,4
4	Febri Dwi Yuspratika	4,7	2	3,6
5	Diana Samosir	4,0	2	3,2
6	Widi Nazraini	4,0	3	3,6
7	Rahmawati	4,7	3	4
8	Raini	4,3	2	3,4
9	Nisyia Azzahra	4,0	2,5	3,4
10	Suhabil Alfajri	4,7	3	4
...		...	...	...
...		...	...	...
30	Ismailda Chelseana	4,7	3	4

After the ranking was carried out, the top 10 rankings were obtained in table 9 below:

Table 9. GAP Value Weighting Profile Matching Method

No	Alternative	Core Factor Value	Secondary Factor Value	Total
1	Putri Alya Rmdhani	5,0	4	4,6
2	Yola Novisyah Putri	4,7	3,5	4,2
3	Arifa Andini	4,7	3,5	4,2

4	Rahmawati	4,7	3	4
5	Suhabil Alfajri	4,7	3	4
6	Wahyu Rizalul Pikri	4,7	3	4
7	Eva	5,0	2,5	4
8	Ismailda Chelseana	4,7	3	4
9	Nadya Ulya	4,3	3	3,8
10	Febri Dwi	4,7	2	3,6

Image 2. Criteria View

Image 6. Calculating Core Factor and Secondary Factor

Image 3. Alternative View

Image 7. Ranking Result

NILAI GAP											
Berikut ini adalah hasil perhitungan nilai GAP											
NO.	ALTERNATIF	GAP	Bobot	GAP	Bobot	GAP	Bobot	GAP	Bobot	GAP	Bobot
1	Isnaini Dewi	-1	4	0	5	-1	4	-4	1	-2	3
2	Nayla Dzarifah Ramadhanty	-1	4	0	5	-1	4	-4	1	-2	3
3	Maya Rani	-1	4	0	5	-2	3	-3	2	-2	3
4	Febri Dwi Yuspratika	-1	4	0	5	0	5	-4	1	-2	3
5	Diana Sabila Samosir	-1	4	-1	4	-1	4	-4	1	-2	3
6	Widi Nazrini	-1	4	-1	4	-1	4	-2	3	-2	3
7	Rahmawati	-1	4	0	5	0	5	-4	1	0	5
8	Ukhti Rani	-1	4	0	5	-1	4	-4	1	-2	3
9	Nisya Azzahra	-1	4	-2	3	0	5	-4	1	-1	4
10	Suhabil Alfajri	-1	4	0	5	0	5	-3	2	-1	4

Image 5. Find GAP Value

Based the results of the decision-making system ranking using the profile matching method, optimal results were obtained, where there were similarities between manual calculations and the decision support system based on the profile matching method, namely having the best results on behalf of Putri Alya Ramadhani who had the highest score (4.6) becoming the best candidate as a recipient of the KIP Kuliah scholarship. In addition, the use of profile matching in this research case study resulted in the right decision, because many efficiency values were obtained as shown in the following tabl

Table 10. Comparison Table With And Without Profile Matching

Aspect	Manual Selection Without Dss	Selection By Profile Matching Method With Dss
Selection Method	Manual, based on subjective assessment by administrators	Automated, using the Profile Matching method
Selection Accuracy	Prone to bias and human error	More accurate and objective, following weighted criteria
Processing Speed	Slow, as each applicant must be reviewed individually	Fast, as the system performs calculations automatically
Transparency	Lacks transparency since evaluation criteria are not clearly structured	Transparent, with well-defined weightings and ranking results
Work Efficiency	Requires more manpower and time	Reduces workload through process automation
Decision Reliability	Inconsistent, depending on individual judgment	Consistent, as all candidates are assessed using the same parameters
Final Outcome	Potentially inaccurate selection	More precise selection of eligible scholarship recipients

CONCLUSION

The developed Decision Support System has provided optimal results in the selection process for recipients of the Smart Indonesia Card Program (KIP) at Royal University by utilizing the Profile Matching method. This system has successfully resolved problems in decision making involving various criteria and alternatives by providing clear rankings. The application of the Profile Matching method in the designed application makes it easier for KIP Kuliah Program managers at Royal University to determine scholarship recipients. With this system, it is expected to minimize errors or inaccuracies in targeting in the selection of KIP Kuliah Program recipients.

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