

# Decision Support System For Determining The Best Lecturers And Students In The Information Technology Study Program, UM Palembang Using The Multi Attribute Utility Theory Method

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Article Info	ABSTRACT
Keywords:	Evaluation of lecturer performance and student achievement is an
Best Lecturers and Students,	important step to maintain academic quality in higher education. The
Academic Performance	Information Technology Study Program at Universitas Muhammadiyah
Evaluation,	Palembang requires an efficient and objective system to select the best
Multi Attribute Utility Theory,	lecturers and students, considering their role in improving academic
RAD,	quality and institutional reputation. This study aims to develop a
SPK.	technology-based decision support system (DSS) to improve the
	automation and accuracy of the selection process. Using the Multi
	Attribute Utility Theory (MAUT) method, various assessment criteria are
	processed into standardized scores, allowing for objective assessment
	of lecturers and students. The Rapid Application Development (RAD)
	method is used in system development to ensure the process is fast and
	effective. This system is designed using various modeling diagrams,
	such as flowcharts, use case diagrams, and class diagrams, to ensure a
	clear, structured, and easily understood workflow for users, including
	administration and academics. The test results show that this system
	facilitates the selection process, reduces processing time, and minimizes
	errors that often occur in manual assessments. In addition, this system
	increases the transparency of assessments, provides objective, accurate,
	and accountable results, and encourages healthy competition among
	lecturers and students. The success of this implementation is expected
	to become a standard for periodic assessment in higher education. In
	addition, this system has the potential to be developed into a web-based
	application, which allows wider access for the entire academic
	community and increases the accessibility and effectiveness of the
	selection process in the future.
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### INTRODUCTION

Advances in information technology have brought about major changes in various sectors, including higher education (Maritsa et al., 2021). This technology enables effective processing of academic and administrative data, thus facilitating decision making (Mondial et al., n.d.). In

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the context of education, Decision Support Systems (DSS) play an important role in assisting more accurate and relevant academic evaluations, as well as improving the quality of educational services in higher education (Huda et al., 2024). In higher education, DSS enables objective assessments of lecturers and students and reduces the subjectivity that often occurs in manual assessment methods (Marpaung1 et al., 2018). This technology supports the provision of comprehensive and transparent academic information, which not only facilitates evaluation but also helps study programs determine the quality of graduates more accurately (Keterbukaan et al., 2018).

Websites as information media play an important role in distributing academic data. This platform allows lecturers and students to easily access assessment data, accelerate the communication process, and increase information transparency in educational institutions (Ummah, 2019). The development of a Rapid Application Development (RAD)-based system in a web-based application increases efficiency by reducing development time and facilitating access for users (FURAT, 2023). In the application of DSS, the Multi Attribute Utility Theory (MAUT) method has proven effective in handling various assessment criteria. MAUT allows for more measurable and objective assessments through value weighting, which provides consistent and transparent results in selecting the best alternative (Dwitasari, 2024). In the Information Technology Study Program, Muhammadiyah University of Palembang, the MAUT method is applied to assess lecturers and students based on various predetermined performance indicators, such as teaching quality, discipline, and achievement (Ermawati &Hidayat, 2017).

Based on these problems, this study aims to design a MAUT-based decision support system to determine the best lecturers and students in the Information Technology Study Program, Muhammadiyah University of Palembang. It is expected that this system can increase transparency and efficiency in the assessment process, as well as support better decision making in managing the quality of education.

#### Literature Review

No Researcher	Research Title	Research result
1. Wayan Sutrisna	Decision Support	Researchers created a decision support
Yansa, Komang Tri	System best deci-	system for determining the best lecturer
Werthi, I Putu Sat-	sion making	which was developed and implemented us-
wika		ing the (AHP) method.
2. Yogi Setiawan, Su-	Decision Support	This study designs a system for determin-
larso Budilaksono	System for Select-	ing the best graduating students devel-
	ing the Best Grad-	oped using the (MAUT) method.
	uates	

#### METHODS

The RAD (Rapid Application Development) model is used by the author in this study as a system development model. The RAD method is a software development process that emphasizes a short development cycle (Maharrani et al., 2021). The RAD (Rapid Application

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Development) model is often referred to as a fast and flexible development cycle, making it easy to adjust to changing needs during the process (Pricillia & Zulfachmi, 2021).

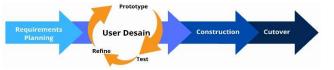


Figure 1 RAD Method

To understand the software according to user needs, interactive and thorough requirements gathering is carried out (Annisa Amalia & Santoso, 2021). Software design is a process consisting of various steps that focus on the design of a software program created in a repetitive cycle, including coding, interfaces, and data structures, so that the design results can be immediately implemented into functioning code (Ayoub et al., 2020). After the software is developed, testing is carried out to ensure that each component functions as intended, minimizes errors, and maintains quality. In addition, the maintenance stage in RAD allows for continuous development based on user input and changing needs (Ramadhan & Angelia, 2023).

In this study, the authors developed a technology-based decision support system (DSS) to improve automation and accuracy in the selection process (Setiawan & Budilaksono, 2021). Using the Multi Attribute Utility Theory (MAUT) method, this system converts various assessment criteria into standardized scores, allowing for a more objective assessment (Aldo, 2019). The MAUT method produces a ranking of the best alternatives based on an analysis of various criteria that serve as guidelines for decision making (Faran & Aldisa, 2023). In summary, the steps of the MAUT method are as follows:

- a. Collecting some of the existing attributes
- b. Determining the weight for each attribute.
- c. Collecting each existing alternative.
- d. Enter the utility for each alternative according to its attributes.

e. Multiply the utility by the weight to determine the value of each alternative.

$$U(x)b = \frac{a-b^-}{b^+-b^-}\dots\dots\dots\dots\dots\dots$$

Where :

U(x) : Normalization of alternative weight X

a : Alternative value

Matrix normalization:

b<sup>-</sup> : Minimum alternative value of criterion a

 $b^{\star}$ : Maximum alternative value of criterion b

The overall evaluation value can be defined by the equation:

$$A(x) = \sum_{a=1}^{n} Wa. U(x) \dots \dots \dots$$



Where A(x) is the evaluation value to (*a*) and (*Wa*) is the weight of several elements to (*a*) against other elements. While n is the number of elements. The total of the weights is 1. The flow of the MAUT method process is described as follows:



Figure 2 MAUT method flow stages

## **RESULTS AND DISCUSSION**

#### Overview of the running system

Figure 3 explains the process of determining the best lecturers and students is done manually. The overview of the running system is: First, the admin creates the requirements needed, after creating the requirements, the admin provides information to the lecturers and students, after which the students prepare the required files. Next, the admin processes and summarizes the results of the scores, and the admin makes a report.

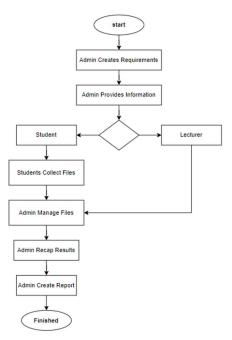


Figure 3 Running System

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#### Description of the proposed system

The description of the proposed system is a description to determine a system flow where the admin can directly access the dashboard page or login first. After the user logs in, the user will be redirected back to the dashboard page. The admin manages the criteria data and manages the criteria sub-data. After managing the data, the admin manages the lecturer and student data. Furthermore, the admin inputs the lecturer and student values according to the existing data.

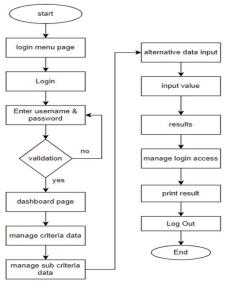


Figure 4 The proposed system

#### System Design

a. Use Case Diagram

Figure 5 below explains the use case diagram in the system design that the author created. There are 3 actors who can access the system which is determined based on the account level, including:

- 1. Admin has login access, manage access rights data, manage criteria data, manage sub data, manage lecturer and student data, manage value data, view ranking results and print data.
- 2. Lecturers have login access, view ranking results.
- 3. Students have login access, view ranking results.





Figure 5 Use Case

b. Activity Diagram

Figure 6 below explains the Activity Diagram flow that is designed when the admin opens the application, a login menu will be displayed to access the admin dashboard page. There are many menus that can be accessed by the admin. The admin can select the menu according to the admin's needs.

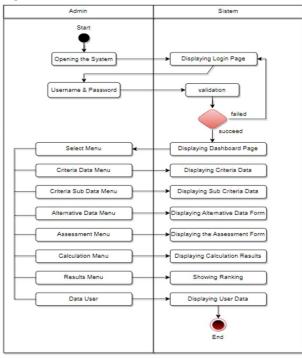
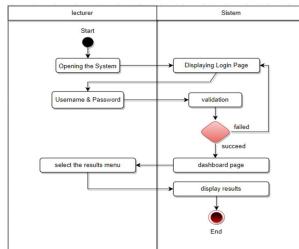


Figure 6 Admin activity diagram

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Figure 7 below explains the flow of the activity diagram designed when the lecturer opens the application, a login menu will be displayed to access the dashboard page. There is a results menu that can be accessed by the lecturer. Figure 8 below explains the flow of the activity diagram designed when students open the application, a login menu will be displayed to access the dashboard page. There is a results menu that can be accessed by students.



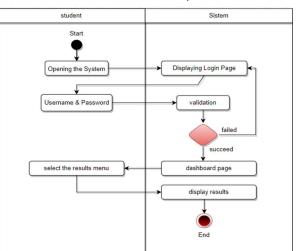


Figure 7 Lecturer activity diagram

Figure 8 Student activity diagram

c. Class Diagram

Figure 9 is a class diagram design for the Decision Support System for Determining the Best Lecturers and Students in the Information Technology Study Program, UM Palembang Using the MAUT Method.

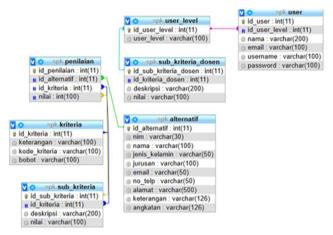


Figure 9 Class diagram

## d. Interface Implementation

The login page functions as a login form input to enter the dashboard page.

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Figure 10 login page

The admin dashboard page consists of menus that each have their own function.

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	Data Kriteria		Data Sub Kriteria	8	Data Alternatif	:2:
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Figure 11 Admin dashboard page

This criteria data list page functions to input values on the sub-data page

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	3	3	Tanggung Jawab	0.10	
	3	C4	Ketaatan	0.10	12 E
	5	CS	Kejujuran	0.20	2
	6	C6	Kerja Sama	0.10	<b>a</b>
	7	C7	Prakarsa	0.10	
	8	CB	Kepemimpinan	0.20	2

Figure 12 Lecturer criteria data

This lecturer assessment page has a function for inputting lecturer grades according to existing data.



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Figure 13 Lecturer assessment page

This student assessment form display has a function for inputting values according to existing data

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Figure 14 Student assessment page

This lecturer's calculation menu page has an automatic calculation function

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No		Nama Dosen		C1	62	63	C4	CS	C6	C7	C8
1	Kamadi, S.Kom, M.Kom			0.05	5	3	5	5	5	5	5
2	Meilyana Winda Perdana, S.Kom, M.	fom		0.05	4	3	4	4	4	3	4
3	Apriansyah, S.Kom., M.Kom			0.04	-4	4	4	5	4	4	5
4	Oedi Haryanto,S.Kom, M.Kom			1	4	4	4	4	5	4	5
5	Jimmie, S.Kom, M.Kom			0.04	4	5	4	4	4	5	6
6	Zulhipni Reno Saputra, S.Kom, M.Kor	i		0.05	5	4	3	4	5	4	4
7	M. Ihsan, ST.,M.Kom			0.05	3	4	3	4	5	4	3
8	Kms. M. Wahyu Hidayat, S.Kom, M.K	om		0.05	4	4	4	5	4	3	4
		Wai A+		.1	5	5	5	5	5	5	5
		Nitai A-		0.04	3	3	3	4	4	3	3
Nermalis		ana Dorra		0		0					
II Normalis		ama Dosen		<b>C1</b> 0.0104	-C2	<b>C3</b>	C4	<b>C5</b>	C6	c7 1	cs
No	N	ens Dosen						1.000			1
No	N Kamadi, S.Kon, M.Kon	ima Doen		0.0104	1	0	1	1	1	1	1
No 1 2	N Kamadi, SiKon, M.Kom Meligena Winda Pendana, S.Kom, M.Kom Apriansyah, S.Kom, M.Kom Dedi Haryanta, S.Kom, M.Kom	una Doén		0.0104 0.0104 0 1	1 0.5	0	1	1 0 1 0	1 0 1	1	0.5
No 1 2 3 4 5	N Kanadi, SiKon, MiXon Melgana Winda Pendana, SiXon, MiXon Aprianyah, SiXon, MiXon Dedi Faranta SiXon, MiXon Jinnia, SiXon, MiXon	ana Deser		0.0104 0.0104 0 1 0	3 0.5 0.5 0.5 0.5	0 0.5 0.5 1	1 0.5 0.5 0.5	1 0 1 0	1 0 1 0	1 0 0.5 0.5 1	1 0.5 1 1
No 1 2 3 4 5 6	N Karnadi, SiXon JAXon Meliyana Winda Pendrani, SiXon JAXon Apriminyah, SiXon, MiXon Dedi Haryanta, SiXon, MiXon Jannia, SiXon, JAXon Zuhyan Rimo Saputra, SiXon, JAXon	wa Diser		0.0104 0.0104 0 1 0 0.0104	1 05 05 05 05 1	0 0.5 0.5 1 0.5	1 0.5 0.5 0.5 0.5 0.5	1 0 1 0 0	1 0 1 0	1 0 05 05 1 05	1 0.5 1 1 1 1 0.5
No 1 2 3 4 5 6 7	Kamadi, SiXon, JAKon Haliyana Winda Pendana, SiXon, JAKon Maliyana Winda Pendana, SiXon, JAKon Dadi Harayata, SiXon, JAKon Jannia, SiXon, JAKon Zulitapa Reno Sagura, SiXon, JAKon M. Itsuan, ST, JAKon	ană Decen		0.0104 0.0104 0 1 0 0.0104 0.0104	1 05 05 05 05 1 0	0 0.5 0.5 1 0.5 0.5 0.5	1 0.5 0.5 0.5 0 0 0	1 0 1 0 0 0 0	1 0 1 0 1 1 1	1 0 05 05 1 05 05	1 05 1 1 1 0.5 0
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1	Kamadi, S.Kom, M.Kom	SUM (0.1040.0104) (0.1041) (0.1040) (0.1041) (0.2041) (0.1041) (0.2041) (0.2041)	0.80104
2	Meliyana Winda Pendana, S.Kom, M.Kom	5UM (0.10x0.0104) (0.10x0.5) (0.10x0) (0.10x0.5) (0.20x0) (0.10x0) (0.10x0) (0.20x0.5)	0.20104
3	Apriansyah, S.Korn, M.Kom	SUM (0.10x0) (0.10x0.5) (0.10x0.5) (0.10x0.5) (0.20x1) (0.10x0) (0.10x0.5] (0.20x1)	0.6
4	Dedi Haryanta,S.Kom, M.Kom	SUM (0.10x1) (0.10x05) (0.10x05) (0.10x05) (0.20x0) (0.10x1) (0.10x05) (0.20x1)	0.6
5	Jimmie, S.Kom, M.Kom	SUM (0.10x0) (0.10x0.5) (0.10x1) (0.10x0.5) (0.20x0) (0.10x0) (0.10x1) (0.20x1)	0.5
6	Zulhipri Reno Saputra, S.Kom, M.Kom	SUM (0.10x0.0104) (0.10x1) (0.10x0.5) (0.10x0) (0.20x0) (0.10x1) (0.10x05) (0.20x05)	0.40104
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8	Kms. M. Wahyu Hidayat, S.Kom, M.Kom	SUM (0.10x0.0104) (0.10x0.5) (0.10x0.5) (0.10x0.5) (0.20x1) (0.10x0) (0.10x0) (0.20x0.5)	0.45104

Figure 15 Lecturer grade calculation page

This student calculation menu page has an automatic calculation function.

6	Data	Perhitungan						
ľ	E March	Keputusan X						
	No		Nama Dosen	61	C3	ca	64	cs
	1	Witmu Dwi Cahya		1.5	2	1.5	1	2
	2	Anggie Kapeda		1	2	1.5	2	1.5
	3	Yelda Petria m.p		0.5	15	1.5	a -	1.5
	4	Ahryad		0.5	1.5	1	1.5	2
	5	Desse Karan Prayoga Putri		1	2	2	1.5	2
	6	Aktar Anagrah Pratama		1	2	1	1.5	2
	2	Khoirunnisa Nabila Sobrina		1.	2	1.5	1.5	1
	8	Della Caressa		2	2	1.5	1	1
	3	Ahmed Pulus		1.5	1.5	1.5	ii :	1
	10	Anita Khusuma Sari		0.5	2	1.5	1.5	2
			Nilai A+	2	2	2	2	2
			Nilai A-	0.5	1.5	1	1	1
	III Norma	lisasi Matrix X						
	No		Narsa Dosen	C1	e1	9	64	C5
	1	Wisnu Dwi Cahya		0.6667	1	0.5	0	1.
	2	Angpie Kapeda		0.3333	1	0.5	1	0.5
	3	Yelda Petria m.p		0	0	0.5	0	0.5
	4	Ahmad		0	0	0	0.5	1.
	.5.	Desse Karan Prajoga Puts		0.3333	1	1	0.5	1.
	6	Akbar Anugrah Pratama		0.3333	1	0	0.5	1
	7	Khokumisa Nabila Sobrina		0.3333	1	0.5	0.5	0
	8	Della Caressa		1	1	0.5	0	0
	.9	Ahmad Pulus		0.6667	0	0.5	0	0
	10	Anita Khusuma Sari		0	1	0.5	0.5	1
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	2	Anggie Kapeda			1) (20x0.5) (20x1) (20x0.5			66.866
		Yelda Petria m.p			20x0.5) (20x0) (20x0.5)			20
	4	Ahmad			(20x0) (20x0) (20x1)			30
	5	Desse Karan Prayoga Putri			1) (20x1) (20x0.5) (20x1)			76.666
	6	Akbar Anugrah Pratama			1) (20×0) (20×0.5) (20×1)			56,666
	7	Khoirunnisa Nabila Sobrina		SUM (20x0.3333) (20x)	L) (20x0.5) (20x0.5) (20x0			46.666
								50
	8	Della Caressa		SUM (20x1) (20x1)	(convol (conv) (conv)			
	8	Della Caressa Ahmad Pulus			0) (20x0.5) (20x0) (20x0)			23.334

Figure 16 Student grade calculation page

The lecturer ranking results page functions to display the best lecturer ranking results

	陆 Data Hasil Akhir			🕀 Cetak (
*	🖽 Hasit Akhir Perankingan			
	MDN	Nama Dosen	Nital Preferenti	Ranking
	0210038202	Kamadi, S.Kon, M.Kon	0.8010	1
	0204049003	Apriansyah, S.Kom, M.Kom	0.6000	2
	0201089001	Dedi Haryanto,S.Kom, M.Kom	0.6000	3
	0222047702	Jmmin, S.Kom, M.Kom	0.5000	- 4
	0225068904	Kms. M. Wahyu Hidayat, S.Kom, M.Kom	0.4510	5
	0205118002	Zužbipni Reno Saputra, S.Kom, M.Kom	0.4010	6
	0212059002	Molyana Winda Perdana, S.Kom M.Kom	0.2010	7
	0207129001	M. Imax, ST. M.Kow	0.2010	



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The student ranking results page functions to display the best lecturer ranking results.

Deddoard	陆 Data Hasil Akhi	ir			🖶 Cetak De
	B Hand Akhir Perankingan				
Masser Data	E has whe realings				
E Deta Dosen	Nim	Alternatif / Nerna Mahaslawa	Arrestet	Nilai Preferenal	Ranking
Deta Hahasitwa	162023035	Desse Karan Prayoga Putri	Satom Informasi	76,8660	1
esistan >	162021032	Anggie Kapeda	Sistem Informasi	65,6960	2
Hall >	162021031	Wisnu Dwi Cahya	Sistem Informasi	63.3340	3
and the second se	162021040	Anita Khasama Sali	Sistem Informasi	60.0000	4
Data Uver	162021036	Akbar Anugrah Pratama	Sixtem Informasi	50.0000	5
Data Invitta	162021038	Detia Caressa	Sistem Informasi	50,0000	6
•	162021037	Khuirunnisa Nabila Sobrina	Sistem Informasi	46.6660	2
•	162021034	Ahmad	Sistem Informasi	30.0000	8
	162021039	Ahmad Pubus	Sistem Informasi	23.3340	9
	162021033	Yelda Petria m.o	Sistem Informasi	20.0000	10

Figure 18 Student Ranking Results Page

#### This user data menu page displays user data

🔅 sek								
		🍪 Data Us	er				+ Tambah Data	
	•	🖽 Daftar Data U	lser					
		Show 10 0 e	Show to a entries					
		No 1	Nama 0	E-mail (1)	Usemene	Level (	Aksi 0	
	•	1	Admin	admin@gmail.com	admin	Administrator	<ul> <li>Image: Contract of the second s</li></ul>	
		2	GAMMAD	ahmad@gmail.com	mahasiswa	Mahasiswa	<ul> <li>Image: Image: Ima</li></ul>	
		3	Aprianoyah	apriantiyah@gmail.com	doten	Dosén	•	
		Showing 1 to 3 of	13 entries				Previous 1 Next	

Figure 19 User Data Menu Page

The lecturer dashboard page consists of a results menu which has the function of viewing the best lecturer prank results.

🌻 SPK						dosen 💄		
# Dushboard	😭 Dashboard	A Dashboard						
warrenan 🕈 Hast 🔍 👻	Selamat datang DOSENI Anda bisa mengop	Selamat datang DDSBN Anda bisa menggperasikan satam dengan wewerang tartanta melalui pilikan menu di bawah.						
In Hask Dosen	Dashboard	*	Data Hasil Akhir	<u>In</u>	Data Profile	4		
🛔 Data Profile								

Figure 20 Lecturer dashboard page

The student dashboard page consists of a results menu which has the function of viewing the best lecturer prank results.

🏮 SPK						DOSEN 💄
Deshboard	A Dashboard					
	Selamat datang DOSEN! Anda bisa mengope	x				
In Haol Dosen	Dashboard	*	Data Hasil Akhir	<u>In</u>	Data Profile	4

Figure 21 Student dashboard page

Decision Support System For Determining The Best Lecturers And Students In The Information Technology Study Program, UM Palembang Using The Multi Attribute Utility Theory Method–Apriansyah et.al



#### Print Data Menu Display

FAKULTAS TEKNIK TEKNOLOGI INFORMASI UNIVERSITAS MUHAMMADIYAH PALEMBANG 2023					
NIDN	LAPORAN DATA DOSI	EN Nilai Preferensi	Ranking		
0210038202	Karnadi, S.Kom., M.Kom	0.8010	1		
0204049001	Apriansyah, S.Kom., M.Kom	0.6000	2		
0201089001	Dedi Haryanto, S.Kom, M.Kom	0.6000	3		
0222047702	Jimmie, S.Kom.,M.Kom	0.5000	4		
0225068904	Kms. M. Wahyu Hidayat, S.Kom.,M.Kom	0.4510	5		
0205118002	Zulhipni Reno Saputra, S.Kom.,M.Kom	0.4010	6		
0212059002	Meilyana Winda Perdana, S.Kom.,M.Kom	0.2010	7		

Figure 22 Print Data Menu Display

#### CONCLUSION

This MAUT-based Decision Support Application provides convenience for educational institutions in selecting the best lecturers and students more objectively and efficiently. In addition to saving time, this system also supports transparency in the assessment process, resulting in more accurate decisions. As a recommendation, further development can include continuous monitoring of lecturer and student performance features, which will provide greater benefits in improving the quality of education at the institution.

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