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The Best Smartphone Brand using The Preference Selection Index Method

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Abstract — The existence of the Covid-19 pandemic has had a tremendous impact in all aspects, including the educational aspect. Before the pandemic, education generally is done by face-to-face learning, but after the pandemic hit, it changed to online learning. Several problems often occur during online learning education, especially for college students, such as a mobile phone that does less support for online learning activities. Hence, the author wants to build an application that has the function of helping users to choose a mobile phone which supports online learning activities. The selection decision used by the author is the Preference Selection Index method since it can determine the value for each attribute and continue with a ranking that is able to select each attribute from the best alternative from several existing alternatives, with the help of a decision support system and application of the PSI (Preference Selection Index) method. The result indicates that the highest value obtained from smartphone selection with an average price under 3 million rupiah is infinix by 90.88%. The application's output meets the purpose because it is able to provide recommendations to buyers in determining which smartphone to buy and can simplify the decision-making process to become more accurate, effective, and efficient in generating information.

Keywords—Decision Support System, Online Learning, Smartphone, Preference Selection Index

I. INTRODUCTION

The existence of the Covid-19 pandemic has had an enormous impact in all aspects, including the educational aspect. Before the pandemic, education generally is done by face-to-face learning, but after the pandemic hit, it changed to online learning. This change was made to adjust to the COVID-19 pandemic conditions and the use of online-based learning in Indonesia. With an online learning system, several problems often arise that are faced by students. Some of the problems that are often experienced by students such as lecture material that the lecturer has not completed, but students have to do their assignments, plus assignments from other courses that must be completed according to the due date given by the respective lecturers. The most perceived obstacles are signal difficulties, quotas run out quickly, and the media often hangs or errors, causing delays in accessing learning information [1].

Distance education aims to improve the quality of education and the relevance of education and increase equitable access and expansion of education. Distance education with good quality assurance and in accordance with the needs of stakeholders is one of the mechanisms for expanding access to higher education. The Distance Learning Program is an alternative that every university currently uses to carry out the teaching and learning process, even though it is not face-to-face. The change in the learning process from face-to-face learning to distance learning is a decision that must be taken by universities so that educational goals can be implemented effectively and efficiently [2].

Some of the obstacles that occur in online learning that is obtained based on the results of interviews and questionnaires are as follows, Physical limitations and memory limitations on devices used to participate in online learning. Facing offline to online learning has several major challenges for students. One of them is preparing a device that supports online learning. The constraints on the physical limitations of the device experienced are the smartphone's power is rapidly decreasing, and the occurrence of errors on the device used when participating in online learning. In addition to physical limitations, students also experience memory limitations on devices used to carry out online learning. As for the

constraints on memory limitations experienced, the memory storage on the device used is not sufficient to facilitate and accommodate data and the platform used to carry out online learning.

Unstable network conditions or internet signal. One of the challenges for students in participating in online learning to be able to connect to web networks is that they need a stable or adequate internet signal. The obstacles experienced by students related to unstable internet networks or signals when participating in online learning were not being able to attend lectures effectively. When learning is carried out synchronously, the voice sounds intermittent, and the information conveyed by the lecturer is often missed. In addition, network instability or internet signal also causes slow access to the learning platform, unable to submit assignments on time, and unable to attend lectures when carried out synchronously [3].

The method applied in this decision support system is the PSI (Preference Selection Index) method; the PSI method is a decision-making tool from several types of criteria without computing weights on attributes. In making decisions, the count of each criterion and alternative will produce the immense Preference Index value and be the best alternative or chosen. This method is beneficial in determining the interests of each candidate or alternative between criteria in the event of a conflict of values [4].

II. Literature Review

A. Decision Support System

A Decision Support System is a combination of individual intelligence sources with component capabilities to improve decision quality [5]. The decision support system is an interactive computer-based system that can help decision-makers solve unstructured problems [6]. The concept of Decision Support Systems (DSS) is needed in the supporting stages for making a decision. It starts with identifying problems, data selection, approach selection, and evaluating such an approach. The main objective is to help in making decisions, both structured and semi-structured issues [7].

B. Distance Learning

Online learning is considered a new paradigm in the learning process because it can be done effortlessly without having to meet face to face in the classroom and only relying on internet connection-based applications so that the learning process can take place [8]. Online learning is learning that uses the internet network with accessibility, connectivity, flexibility, and the ability to bring up various types of learning interactions.

C. Method (Preferences Selection Index)

Preference Selection Index method to solve the problem of material selection (MCDM). In contrast to most methods (MCDM). Actually, the Preference Selection Index Method determines the weight of the criteria only by using the information provided in the decision matrix, that is, using an objective approach to determine the weight of the criteria. This method is also proper when there is a conflict in determining the relative importance between attributes [9].
The steps involved in the Preference Selection Index method are as follows:

Determine the problem,dDefine goals and identify attributes and alternatives related to the decision-making problem.
Formulating a decision matrix:
This step involves constructing a matrix based on all available information describing the attributes of the problem. Each series decision matrix is allocated to one alternative and each column to one attribute; therefore, the Xij element of the decision matrix X assigns the attribute values in the original values. So, if the number of alternatives is M and the number of attributes is N, then the decision matrix as an N·M matrix can be represented as follows:

$$X_{ij} = \begin{bmatrix} X_{11} & X_{12} & .. & X_{1N} \\ : & : & .. & X_{2N} \\ X_{M1} & X_{M2} & .. & X_{MN} \end{bmatrix} \quad (1)$$

Normalization of decision matrix,
If the attribute is of type favorable condition, then a more considerable value is desired, which can be normalized as:

$$X_{ij} = \frac{X_{ij}}{X_j^{Max}} \quad (2)$$

If the attribute is of unfavorable type, then a smaller value is desired, which can be normalized as:

$$X_{ij} = \frac{X_j^{Min}}{X_{ij}} \quad (3)$$

Where:
Xij is the measure of the attribute (i = 1, 2, ..., N dan j = 1, 2, ..., M)

Count the mean value of the normalized data,
This step means that the value of the normal data for each attribute is counted by the following equation:

$$N = \frac{1}{n}\sum_{i=1}^{n} N_{ij} \quad (4)$$

Count the value of preference variation,
In this step, a preference variation value between the values of each attribute is counted using the following equation:

$$\phi_j = \sum_{i=1}^{n}[N_{11} - N]^2 \quad (5)$$

Determine the deviation in the value of the preference,

$$\Omega_j = 1 - \phi_j \quad (6)$$

Determine the weight criteria.

$$\omega_j = \frac{\Omega_j}{\sum_{i=1}^{m}\Omega_j} \quad (7)$$

The total value of the overall weighted criteria of all attributes must be one, for example:

$$\sum_{i=1}^{m}\Omega_j = 1 \quad (8)$$

Count PSI (θ_i),
Now, calculate the preference index selection for each alternative using the following equation:

$$\theta_i = \sum_{j=1}^{m} X_{ij}\ \omega_j \quad (9)$$

Choose a suitable alternative for the given application. Finally, each alternative is classified according to descending or ascending order to facilitate managerial interpretation of the results. The alternative with the highest preference choice index will be classified first, and so on.

III. Result And Discussion

A. *The following table is the mobile data.*

Table I. Mobile Data

Smartphone ID	Smarthphone Name
A1	Infinix
A2	Xiaomi
A3	Samsung
A4	Vivo
A5	Oppo
A6	Realme
A7	Sony
A8	iPhone

B. *Determining Criteria.*

The following are supporting criteria for the decision-making process using the PSI method.

Table II. Type Of Criteria

Criteria ID	Criteria Name	Attribute
C1	Price	*Cost*
C2	Screen size	*Benefit*
C3	RAM	*Benefit*
C4	Battery	*Benefit*
C5	Internal memory	*Benefit*
C6	Camera	*Benefit*
C7	Network	*Benefit*
C8	Screen Resolution	*Benefit*

C. *Condition Data.*

The following table is the condition data where the scale will be used in the calculation process.

Table III. Condition data

Criteria ID	Criteria Name	Condition	Range
C1	Price	0 ≥ x < 2.000.000	1
		2.000.000 ≥ x < 3.000.000	2
		3.000.000 ≥ x < 4.000.000	3
		4.000.000 ≥ x < 5.000.000	4
		≥ 5.000.000	5
C2	Screen size	0 ≥ x < 4,75	1
		4,75 ≥ x < 5,25	2
		5,25 ≥ x < 5,75	3
		5,75 ≥ x < 6,25	4
		≥ 6,25	5
C3	RAM	< 2 GB	1
		2 GB	2
		3 GB	3
		4 GB	4
		> 4 GB	5
C4	Battery	0 ≥ x < 2250	1
		2250 ≥ x < 2750	2
		2750 ≥ x < 3250	3
		3250 ≥ x < 3750	4
		≥ 3750	5
C5	Internal memory	< 8 GB	1
		16 GB	2
		32 GB	3
		64 GB	4
		> 128 GB	5
C6	Camera	0 ≥ x < 5	1

D. *Value Data.*

The following table contains data on the choice of mobile phones to be used in the calculation process.

Table IV. Value Data

Smartphone ID	Criteria							
	C1	C2	C3	C4	C5	C6	C7	C8
A1	1.700.000	7	> 4 GB	5000	64 GB	16	4 G	1080p FHD
A2	2.200.000	6,5	4 GB	5000	> 128 GB	8	5 G	FHD+/QHD
A3	2.300.000	6,5	> 4 GB	5000	> 128 GB	8	4 G	720p HD
A4	2.100.000	6,5	4 GB	5000	> 128 GB	8	4 G	720p HD
A5	2.300.000	6,5	4 GB	5000	64 GB	16	4 G	720p HD
A6	2.700.000	6,6	> 4 GB	5000	> 128 GB	16	4 G	1080p FHD
A7	2.300.000	5	2 GB	2300	16 GB	8	4 G	720p HD
A8	2.600.000	5,5	2 GB	2750	16 GB	5	4 G	1080p FHD

E. *Decision Matrix.*

Determine the normalization matrix; after obtaining this value, determine the total and average values for each criterion.

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Table V. Decision Matrix

Smartphone ID	Criteria							
	C1	C2	C3	C4	C5	C6	C7	C8
A1	1	5	5	5	4	4	4	3
A2	2	5	4	5	5	2	5	4
A3	2	5	5	5	5	2	4	2
A4	2	5	4	5	5	2	4	2
A5	2	5	4	5	4	4	4	2
A6	2	5	5	5	5	4	4	3
A7	2	2	2	2	2	2	4	2
A8	2	3	2	3	2	2	4	3
Max	2	5	5	5	5	4	5	4
Min	1	2	2	2	2	2	4	2

If the attribute of the criteria is cost, then the normalization matrix calculation is as follows (C1):

$$X_{ij} = \frac{X_j^{Min}}{X_{ij}}$$

$$X_{ij\ (A1)} = \frac{1}{1} = 1$$

$$X_{ij\ (A2)} = \frac{1}{2} = 0{,}5$$

If the attribute of the criteria is benefit, then the normalization matrix calculation is as follows (C3):

$$X_{ij} = \frac{X_{ij}}{X_j^{Max}}$$

$$X_{ij\ (A1)} = \frac{5}{5} = 1$$

$$X_{ij\ (A2)} = \frac{4}{5} = 0{,}8$$

Total is obtained from the sum of the normalized matrix values from the criteria:

$$\left(\sum_{i=1}^{n} N_{ij}\right)$$

$$\left(\sum_{i=1}^{n} N_{ij\ (C1)}\right) = 4{,}5$$

$$\left(\sum_{i=1}^{n} N_{ij\ (C3)}\right) = 6{,}2$$

The average is obtained from the total divided by the number of alternatives:

$$\frac{1}{n}\sum_{i=1}^{n} N_{ij}$$

$$\frac{1}{n}\sum_{i=1}^{n} N_{ij\ (C1)} = \frac{4{,}5}{8} = 0{,}5625$$

$$\frac{1}{n}\sum_{i=1}^{n} N_{ij\ (C3)} = \frac{6{,}2}{8} = 0{,}775$$

Table VI. Normalization Matrix

Smartphone ID	Criteria							
	C1	C2	C3	C4	C5	C6	C7	C8
A1	1	1	1	1	0,8	1	0,8	0,75
A2	0,5	1	0,8	1	1	0,5	1	1
A3	0,5	1	1	1	1	0,5	0,8	0,5
A4	0,5	1	0,8	1	1	0,5	0,8	0,5
A5	0,5	1	0,8	1	0,8	1	0,8	0,5
A6	0,5	1	1	1	1	1	0,8	0,75
A7	0,5	0,4	0,4	0,4	0,4	0,5	0,8	0,5
A8	0,5	0,6	0,4	0,6	0,4	0,5	0,8	0,75
Total	4,5	7	6,2	7	6,4	5,5	6,6	5,25
AVG	0,5625	0,875	0,775	0,875	0,8	0,6875	0,825	0,6563

Determine the preference variation. After obtaining the value, determine the total value of each criterion, the deviation from the total value, and the average of the deviation values. The preference variation is obtained from the normalized matrix value minus the average of the normalized matrix within certain criteria:

$$[N_{11} - N]^2$$

$$C_1\ A_1 = [1 - 0{,}5625]^2 = 0{,}1914$$

$$C_1\ A_2 = [0{,}5 - 0{,}5625]^2 = 0{,}0039$$

$$C_3\ A_1 = [1 - 0{,}775]^2 = 0{,}0506$$

$$C_3\ A_2 = [0{,}8 - 0{,}775]^2 = 0{,}0006$$

Total preference variation is obtained from the sum of the preference variation values from the criteria:

$$\phi_j = \sum_{i=1}^{n} [N_{11} - N]^2$$

$$\phi_{j\ (C1)} = 0{,}2187$$

$$\phi_{j\ (C3)} = 0{,}4348$$

Deviation is obtained from one (1) minus the total:

$$\Omega_j = 1 - \phi_j$$

$$\Omega_{j\ (C1)} = 1 - 0{,}2187 = 0{,}7813$$

$$\Omega_{j\ (C1)} = 1 - 0{,}4348 = 0{,}5652$$

The average is obtained from the value of deviations from certain criteria divided by the total of deviations for all criteria:

$$\omega_j = \frac{\Omega_j}{\sum_{i=1}^{m} \Omega_j}$$

$$\omega_{j\ (C1)} = \frac{0{,}7813}{5{,}3308} = 0{,}1466$$

$$\omega_{j\ (C1)} = \frac{0{,}5652}{5{,}3308} = 0{,}106$$

Table VII. Preference Variation

Smartphone ID	Criteria							
	C1	C2	C3	C4	C5	C6	C7	C8
A1	0,1914	0,0156	0,0506	0,0156	0	0,0977	0,0006	0,0088
A2	0,0039	0,0156	0,0006	0,0156	0,04	0,0352	0,0306	0,1182
A3	0,0039	0,0156	0,0506	0,0156	0,04	0,0352	0,0006	0,0244
A4	0,0039	0,0156	0,0006	0,0156	0,04	0,0352	0,0006	0,0244
A5	0,0039	0,0156	0,0006	0,0156	0	0,0977	0,0006	0,0244
A6	0,0039	0,0156	0,0506	0,0156	0,04	0,0977	0,0006	0,0088
A7	0,0039	0,2256	0,1406	0,2256	0,16	0,0352	0,0006	0,0244
A8	0,0039	0,0756	0,1406	0,0756	0,16	0,0352	0,0006	0,0088
Total	0,2187	0,3948	0,4348	0,3948	0,48	0,4691	0,0348	0,2422
Deviation	0,7813	0,6052	0,5652	0,6052	0,52	0,5309	0,9652	0,7578
AVG	0,1466	0,1135	0,106	0,1135	0,0975	0,0996	0,1811	0,1422

Define the preference selection,
The preference selection index is obtained from the normalized matrix value multiplied by the average of the deviations:

$$X_{ij} * \omega_j$$

$$C_1 A_1 = 1 * 0{,}1466 = 0{,}1466$$

$$C_1 A_2 = 0{,}5 * 0{,}1466 = 0{,}0733$$

$$C_3 A_1 = 1 * 0{,}106 = 0{,}106$$

$$C_3 A_2 = 0{,}8 * 0{,}106 = 0{,}0848$$

Total is obtained from the sum of the preference selection index values in certain alternatives:

$$\theta_i = \sum_{j=1}^{m} X_{ij} * \omega_j$$

$$\theta_{i\,(A1)} = 0{,}9088$$

$$\theta_{i\,(A2)} = 0{,}8557$$

Table VIII. Preference Selection Index

Smartphone ID	Criteria							
	C1	C2	C3	C4	C5	C6	C7	C8
A1	0,1466	0,1135	0,106	0,1135	0,078	0,0996	0,1449	0,1067
A2	0,0733	0,1135	0,0848	0,1135	0,0975	0,0498	0,1811	0,1422
A3	0,0733	0,1135	0,106	0,1135	0,0975	0,0498	0,1449	0,0711
A4	0,0733	0,1135	0,0848	0,1135	0,0975	0,0498	0,1449	0,0711
A5	0,0733	0,1135	0,0848	0,1135	0,078	0,0996	0,1449	0,0711
A6	0,0733	0,1135	0,106	0,1135	0,0975	0,0996	0,1449	0,1067
A7	0,0733	0,0454	0,0424	0,0454	0,039	0,0498	0,1449	0,0711
A8	0,0733	0,0681	0,0424	0,0681	0,039	0,0498	0,1449	0,1067

Sum up each alternative's preference selection index value. After obtaining these values, sort the values from highest to lowest.

Table IX. Ranking Results

Ranking	Smartphone Name	Value
1	Infinix	90,88%
2	Xiaomi	85,57%
3	Realme	85,5%
4	Oppo	77,87%
5	Samsung	76,96%
6	Vivo	74,84%
7	iPhone	59,23%
8	Sony	51,13%

The conclusion is that a worth phone buying based on the calculation of the PSI method is an Infinix brand phone with a value of 90.88%.

A. Interface discussion

Login View, this view is explicitly used for admins to enter the data manipulation menu as long as there is admin account information.

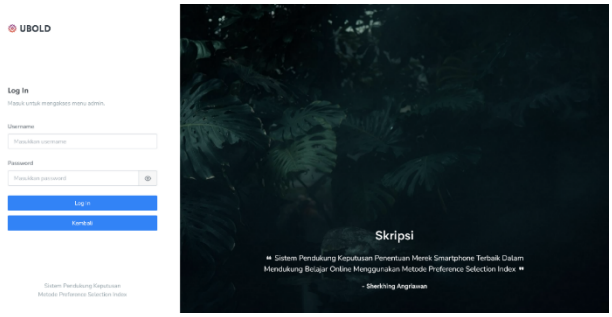

Fig 1. Login View

Mobile Input View, this menu gives admin access to enter cell phone data according to the type of smartphone available.

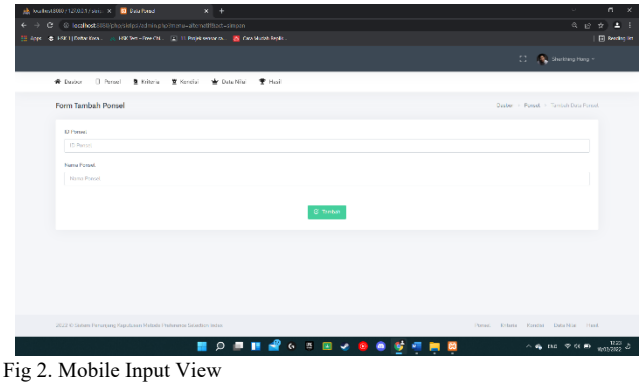

Fig 2. Mobile Input View

Criteria Input View, this menu is used to enter the specifications of the phone and the conditions to determine the calculation of the PSI method. Attributes are used to determine values with different formulas in the Normalization Matrix stage, while input types are used to

determine conditions based on value ranges or descriptions when entering condition data.

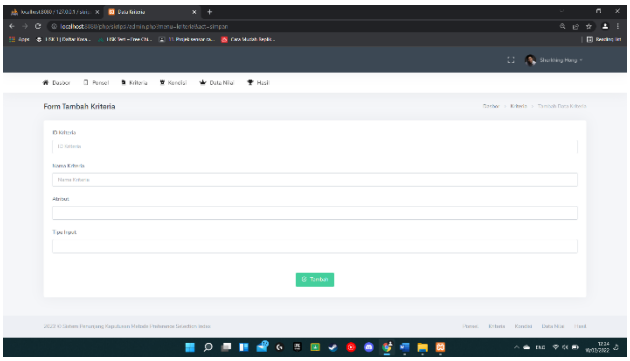

Fig 3. Criteria Input View

Condition Input View, this menu provides scale value requirements so that the values entered in the Value Data menu can be converted to scale according to the conditions entered in this menu.

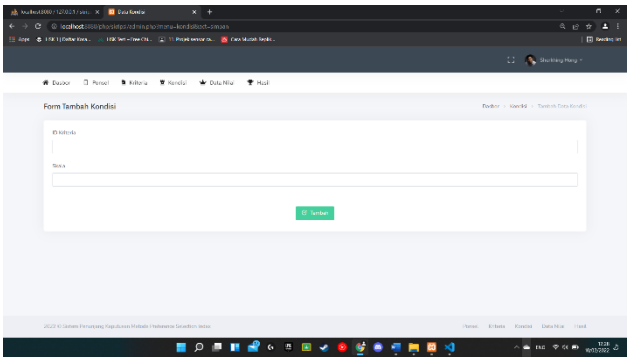

Fig 4. Condition Input View

View of Value Data Input, this menu appears depending on the number of criteria data entered. If the input type is the same as the value, then the input will appear, which can only be a number, as well as a description in the form of a choice of the conditions entered.

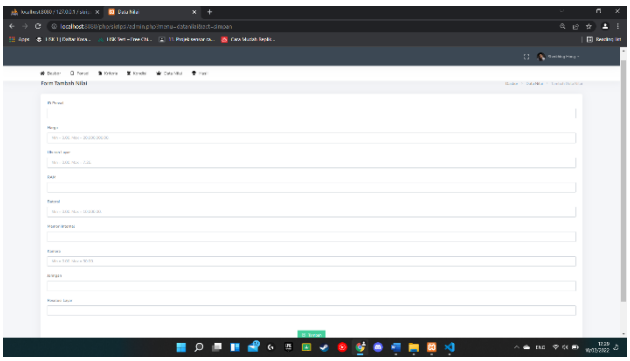

Fig 5. View of Value Data Input

Main Menu Output View, this menu consists of a list of phones and values that have been calculated and sorted from the highest value using the PSI method. The link below this menu can access the login for admin.

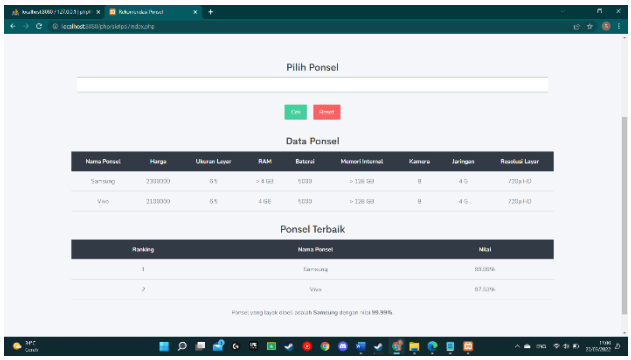

Fig 6. Main Menu Output View

Mobile Output View, this menu contains mobile phone data that has been entered through the application. Users can add, change, and delete data.

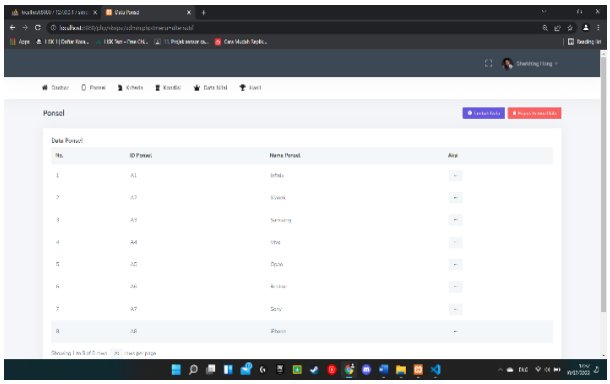

Fig 7. Mobile Output View

Criteria Output View, each criteria data entered through the Criteria Form will be displayed in this menu. Data manipulation commands can be added, changed, and deleted data.

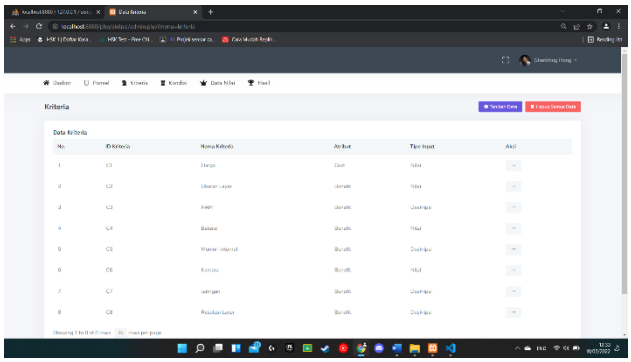

Fig 8. Criteria Output View

Condition Output View, each criteria data that has been previously entered will display a table for each criterion automatically. Each criterion has its provisions for translating mobile phone information into scale values.

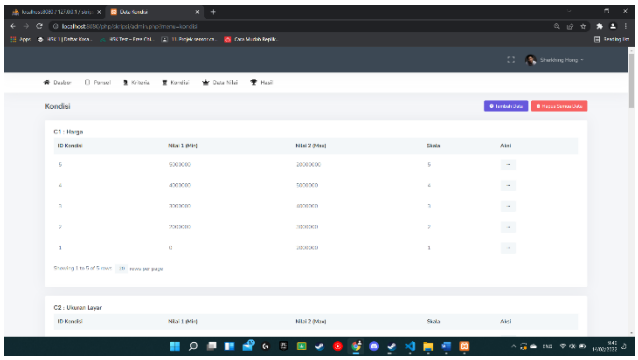

Fig 9. Condition Output View

Value Data Output View, this menu contains valuable data for each cell phone with the previous user's criteria. When criteria are added, users are encouraged to add values for new criteria by selecting the edit menu. Users cannot enter more than one value data for mobile phones with previous value data.

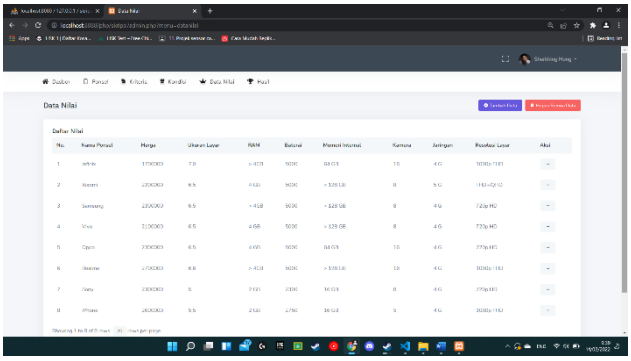

Fig 10. Value Data Output View

View of PSI Calculation Results Output, after the user has entered the value data for each cell phone, the value is converted to a scale according to the conditions in the conditions menu. The following process is to calculate the scale using the PSI method step by step until the program provides ranking results for each cell phone. The highest rating is the top choice and recommended.

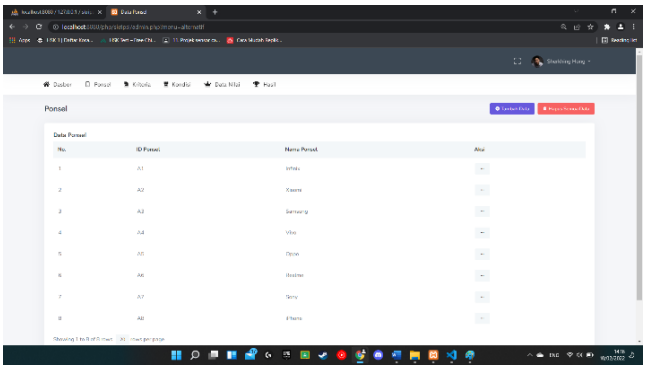

Fig 11. View of PSI Calculation Results Output

IV. Conclusion

There are several conclusions based on the results of the research that has been carried out. First, building a decision support system using the PSI method can provide information on the choice of smartphone brands to customers based on the calculation of the PSI method and ranking of a smartphone so that they can provide information about the smartphone that can support learning activities. Application implementation starts with designing a new system diagram for the selection of smartphones, then designing applications so that admins and customers can interact with the information displayed, and then testing the PSI method calculations to be more effective in determining smartphone recommendations for customers.

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References

[1] R. Vhalery, A. M. Setyastanto, S. N. Alfilail, and E. R. and D. J. Of, “Pembelajaran Berbasis Online ‘Zoom’ Pada Kesiapan Belajar Mahasiswa Di Masa Pandemi Covid-19,” Res. Dev. J. Educ., vol. 7, no. 1, p. 215, 2021.

[2] N. B. Argaheni, “Sistematik Review: Dampak Perkuliahan Daring Saat Pandemi COVID-19 Terhadap Mahasiswa Indonesia,” PLACENTUM J. Ilm. Kesehat. dan Apl., vol. 8, no. 2, p. 99, 2020.

[3] P. M. V. Dewi, N. N. Suartini, D. M. Sri Mardani, and A. Et, “Kendala Mahasiswa Angkatan 2019 Dalam Pembelajaran Daring Semester Genap Tahun Ajaran 2019 / 2020 Pada Mata Kuliah Konten Bahasa Jepang Di Universitas Pendidikan Ganesha,” Penelitian, J. Indones. Mhs., vol. 1, no. 2, 2021.

[4] P. N. Rizanti, L. T. Sianturi, M. Sianturi, and S. N. T. K. dan S. (SAINTEKS), “Sistem Pendukung Keputusan Pemilihan Siswa Pertukaran Pelajar Menggunakan Metode PSI (Preference Selection Index),” Semin. Nas. Teknol. Komput. dan Sains, vol. 1, no. 1, pp. 263–269, 2019.

[5] T. Magrisa, K. D. K. Wardhani, M. R. A. Saf, and I. M. : J. I. I. Komputer, “Implementasi Metode SMART pada Sistem Pendukung Keputusan Pemilihan Kegiatan Ekstrakurikuler untuk Siswa SMA,” Inform. Mulawarman J. Ilm. Ilmu Komput., vol. 13, no. 1, p. 49, 2018.

[6] M. S. Novendri, A. Saputra, C. E. Firman, and A, “Aplikasi Inventaris Barang Pada MTS Nurul Islam Dumai Menggunakan PHP Dan MySQL,” Lentera Dumai, vol. 10, no. 2, pp. 46–57, 2019.

[7] Dewi Nasien, M. Hasmil Adiya, A. Mulyadi, A. Sukabul, G. Rianda, and D. Yulianti, “Decision Support System for Selecting University in Pekanbaru Based on Android,” Int. J. Electr. Energy Power Syst. Eng., vol. 3, no. 2, pp. 30–34, 2020.

[8] A. Sahvira and A. Hafid, “Jurnal Pendidikan & Pembelajaran Sekolah Dasar Hubungan Pembelajaran Online Dengan Motivasi Belajar Siswa Kelas V Sekolah Dasar,” J. Pendidik. Pembelajaran Sekol. Dasar, vol. 1, no. 2, pp. 216–224, 2021.

[9] T. N. Saragih, “Sistem Pendukung Keputusan Pemberian Reward Kepada Karyawan Menggunakan Metode Preference Selection Index,” Semin. Nas. Teknol. Komput. Sains, pp. 615–622, 2019.

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