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Implementing the TOPSIS Method for Book Update and Procurement Priority

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***Abstract* – A library is a building or room designed for the purpose of storing and organizing various types of library items, including books, monographs, serial publications, brochures, and non-library materials. In the Hasanuddin University (Unhas) library, there are at least 516,000 volumes of literature. One of the important things is how to ensure that the contents of the library remain relevant to the special literacy needs of this modern era. Considering that books are static, of course it is necessary to update and procure the newest and most up-to-date types of books. The goal of this research is to use the TOPSIS algorithm to determine the procurement and updating of books in the UNHAS library, particularly at the Faculty of Nursing. Based on the regular year data criteria (2008–2023), it is known that books borrowed (5–25≤) and book stocks (5–45 copies) are based on the publication every five years. It is known that if the preference value (v) > 0.60 is included in the procurement category, preference (v) < 0.30 is included in the updating category, and preference (v) 0.31–0.59 is not included in the procurement and update categories. The ranking results of 6 (six) book samples reveal that 2 (two) categorized into the procurement category with a preference value (v) of 0.64, 2 (two) categorized into the updating category with a preference value (v) of 0.2 and 0.3, and 2 (two) categorized into the category where book updates and procurement do not occur, with preference values (v) of 0.36 and 0.5.**

Keywords: library, TOPSIS, book procurement, and book update.

I. INTRODUCTION

A library is a building or room that stores a collection of library materials, including books, monographs, serial publications, brochures, and other non-library materials [1]. However, the new paradigm defines a library as dynamic, fresh, and alive, offering new things and innovative service products packaged to make the library's offerings attractive, interactive, educational, and enjoyable for its visitors [2].

Given the extensive coverage of the Unhas library, which currently boasts an estimated library collection of around 516,000 volumes, including book materials, theses, dissertations, research reports, magazines, electronic publications, and audio-visual materials, this case study specifically focuses on the Faculty of Nursing. Given that literature is static, it is necessary to update and procure books so that they remain relevant for future research by students, lecturers, and even society in general [3]. For example, scientific work sets preference standards with a maximum lifespan of five to seven years [4]. It appears that relying solely on one criterion is not sufficient for the updating and procurement process; the use of other criteria is necessary to prevent errors during the updating process. The criteria used are the year of publication, the number of books borrowed for reading or reference, and the number of book stocks. When someone searches for books without indexing and is unable to find them, the book procurement section will include the list.

This research uses the TOPSIS method. A popular method is used to support decision-making with an unlimited number of criteria sets [5]. The work process is based on accumulated calculations to determine the shortest interval, or positive ideal solution, and the farthest interval or negative ideal solution [6]. In this case, we determine which books include procurement or updating based on three criteria: year of publication, borrowed books, and book stock. If the book you want to search for has a small number of copies or no copies, then it is included in the procurement category (preference value > 0.60). This is different from books that no longer have any interest in reading but also have a long publication year, so they are included in the book update list (preference value < 0.30).

The literature review was sourced from several studies with similar titles, such as those conducted by Rajib and Reyhan, who applied the TOPSIS method to determine the procurement of book titles in libraries. The problem in this research is that the procurement of purchased book titles is somewhat ineffective, which often results in library staff needing more time to sort out the books that need to be purchased later if the stock of the book they wish to purchase is not available. Based on this problem, the research objective is to measure the level of accuracy in applying the TOPSIS method to determine the procurement of book titles. The steps in this method are determining criteria based on year of publication (2012-2019), availability of complete books (poor, good, sufficient), and book reviews (1–5) using six (six) sample book titles to produce a ranking from the largest book title Strategy: The Art and Science of Strategy Creation and Execution by Crainer, Stuart (book 1, preference value 0.40) to the smallest with the title Strategic Human Resource Management by Mello, Jeffrey A. (book 3, preference value 0.26). [7]

Furthermore, according to Habsyi Ikhlashul Ariq et al., the aim of the research is to increase people's interest in reading books in libraries by providing publications that vary according to readers' interests based on the types of favorite books that are often borrowed by visitors. The problem is that, in order to carry out procurement, library staffs only count the number of borrowers and do not look at the number of books available. This leads to irregular book procurement and a mismatch in the availability of books based on readers' interests. To overcome this problem, researchers used the TOPSIS method with a sample of 50 types of books, using 3 criteria: availability of books (many, few), types of books (textbooks, references), and number of borrowers (> 15 many, < 15 few). The first ranking was based on the title of a book by a great thinker in the world of sayings and wisdom (preference value 1), and The Secret Book of MLM was ranked 50 (preference value 0). [8]

The next literature review is entitled Decision Support System for Procurement of Library Materials for the STT Adisutjipto Library Using the TOPSIS Method by Anton Setiawan Honggowibowo. The mechanism for procuring library materials at STT Adisutjipto Yogyakarta still uses manual methods; library staffs do not yet know which books are most frequently borrowed. The library staff compiles a list of the books students require from various departmental requests and then carefully selects these requests one by one, often failing to meet the demand for new books that align with students' interests. In procuring books at the STT Adisutjipto Yogyakarta library, there are several criteria using the TOPSIS method that will be carried out for data analysis in the process of determining which books will be held, namely budget, materials frequently borrowed, book prices, book editions, book stock, year of publication, and publisher. The TOPSIS method yielded results that identified ANSI books with book ID BK06, assigning a value to each criterion as follows: budget criteria worth 5 points (price equal to Rp. 200,000), book proposal criteria worth 5 points (number of proposals given is more equal to 12 suggestions), the criteria for frequently borrowed books is worth 5 points (in a certain period books are borrowed by library members more than 20 times), the book price criteria is worth 5 points (the price of an ANSI book is more equal to IDR 100,000, -), book edition criteria are worth 4 points (ANSI book edition is the 4th edition), book stock criteria are worth 4 points (the total ANSI book stock in the library is 6-7 books), publication year criteria are worth 5 points (year of publication ANSI's book is 2014), and the final criteria is the publisher worth 4 points (ANSI's book is published by Informatika – Bandung) [9].

II. METHOD AND DESIGN

Here are some of the steps using the TOPSIS method : [19]

A. Normalization of the Decision Matrix

Once the evaluation criteria have been established, calculate the preference value for each criterion, taking into account the relative importance of each criterion. The decision matrix normalization process is the first thing that the system does on the matrix attribute. Normalization compares the attributes on the other side of the square root of each criterion on the attribute to find the other data.

$$R_{ij} = \frac{x_{ij}}{\sqrt{\sum_{i=1}^{m} x_{ij}^2}} \quad (1)$$

B. Normalization of Valued Matrix

The second step is to calculate the normalization of a valued matrix, represented by the letter Y. The assessment is done by calculating the result of a normalized decision matrix with the element on the vector, the valued of preference, symbolized by the W. The calculating equation is as follows:

$$Y_{ij} = W_i \text{ x } r_{ij} \quad (2)$$

C. Positive Ideal Solution and Negative Ideal Solution

A positive ideal solution can be determined based on a value rating or a normalized value (Yij) With the following equation:

$$A^+ = (y_+^1, y_+^2, .., y_+^n) \quad (3)$$

The negative ideal solution is calculated based on the normalized value (Yij). The equation formula is as follows:

$$A^- = (y_-^1, y_-^2, .., y_-^n) \quad (4)$$

D. The interval between each Alternative's Value and The Matrix of Positive and Negative Ideal Solutions.

The formula for the alternative interval of Ai with a positive ideal solution is as follows:

$$D^{+} = \sqrt{\sum_{i=1}^{m}\left(y_i - y_{ij^{+}}\right)^2} \quad (5)$$

The alternative Ai interval with a negative ideal solution is formulated as follows:

$$D^{-} = \sqrt{\sum_{i=1}^{m}\left(y_i - y_{ij^{-}}\right)^2} \quad (6)$$

E. Determination of The Preference Value for each Alternative

A preference value is the final value of the data to be ranked or sorted from the shortest to the longest interval, or from a positive ideal solution to a negative ideal solution. The equation formula is as follows:

$$V_i = \frac{Di^{-}}{Di^{-} + Di^{+}} \quad (7)$$

E. Alternative Data Sequencing Process

The final step involves sequencing data or an equation based on the interval between the positive and negative ideal solutions. The best option is the one with the shortest interval, and, on the contrary, the longest interval is a highly unrecommended alternative.

The design tool in this research uses UML (Unified Modeling Language), producing use case diagrams and class diagrams.

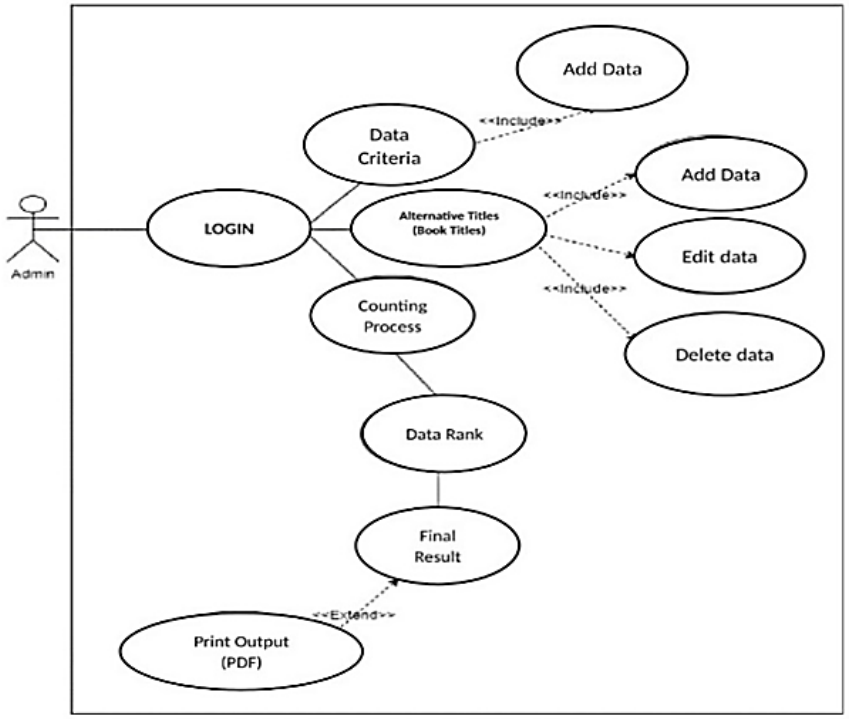

Figure 1. *Uses Case Diagram*

Figure 1 describes the use case of the designed system, which has a single access right, namely admin. The admin's role within the system is as follows:

1. Login is the admin activity for logging into the system.
2. Admins are responsible for managing the data criteria book.
3. The admin's activity involves processing book titles, which includes adding, editing, and deleting book data.
4. The calculation process involves using the TOPSIS method to display a comparison, which in turn leads to the final outcome of updating and book acquisition.

In Figure 2 below, it shows that there are seventeen tables that are interrelated between one table and another, starting with the login table as the starting point for entering the system. Each table contains its respective attributes and operations.

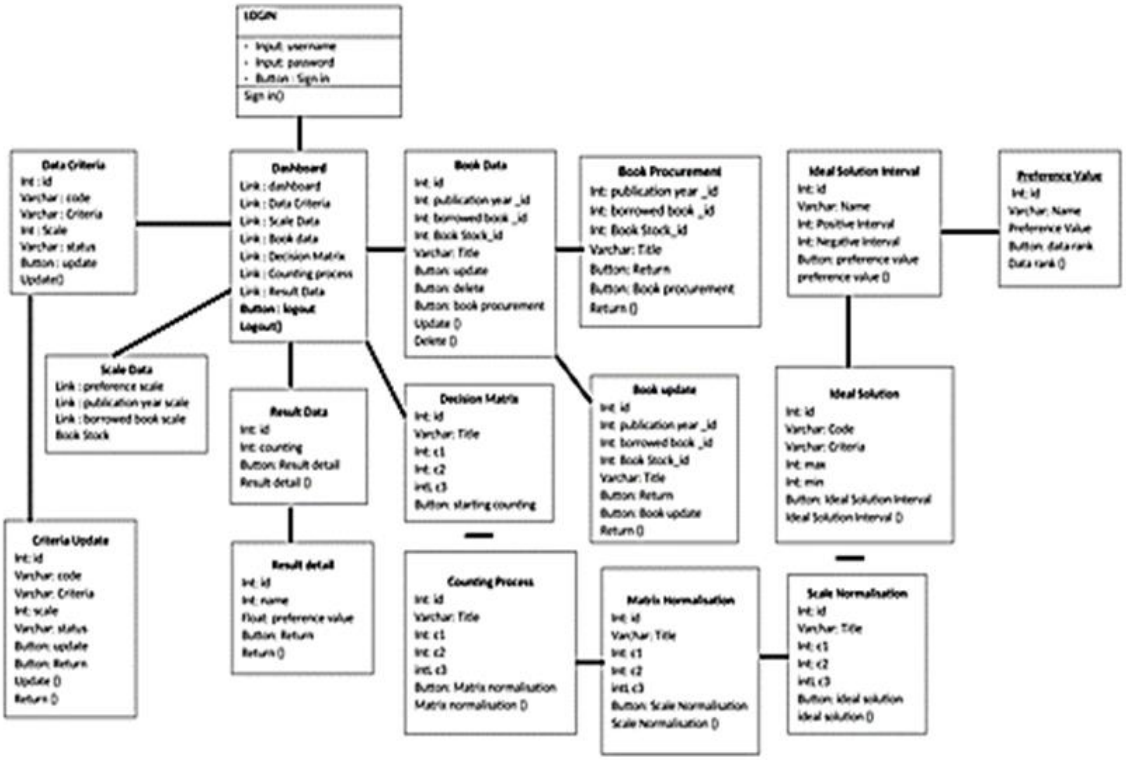

Figure 2. *Class Diagram*

III. RESULTS AND DISCUSSION

The book selection process involves three criteria:

A. The year of publication

The year of publication is counted from the time of its publication, starting from the last five years. In the case of a scientific paper published in 2015, it is considered to be less than 5 years from now, which means the probability of being updated is very high.

B. Total number of borrowed books

This criterion is used as a measure of how often a book with the same title is used by the visitor (lender) for intellectual purposes. If the book with that same title has been borrowed as many as 25 times in a month, then the chance of being updated is very low, and the likelihood of being added is very high, depending on the number of supplies.

C. Total Number of book supplies

The number of book supplies with a particular title will be a criterion based on how many supplies books with the same title there are; if the stock is large, then the likelihood of adding very little; if it is small and the number of readers is large enough, then the probability of increasing is very high; and if there is a small stock and there is also a small number of visitors (lender), then the possibility of updating is high.

Table 1. Data Criteria

Code	Criteria	Percentage	Types
CI	Year of Publication	30%	Benefit
C2	Borrowed books	40%	Benefit
C3	Book stocks	30%	Cost

Table 1 above shows the criteria that exist for each book. First, the year of publication is a criterion that carries a valued of 30%, depending on the type of benefit. Based on the number of publications, five years suffice to determine the duration of each book's library tenure. Second, the book borrowed criteria with a valued of 40% with the kind of benefits has the highest value because the number borrowed indicates that the book is very in demand, and the last criteria of the book stocks, with a value of 30% means that the more book stocks, the smaller the chance for its existence. If each book stock has a lot of lenders, the smaller the chances for its updating. The value t is determined by the circulation of books in the year of publication, which is every five years. A higher number of books borrowed will influence the acquisition of the book, and conversely, fewer books borrowed will affect the updating of the book. The data assessment for each criterion is shown in Table 2, Table 3, and Table 4 below:

Table 2. Scales of publication year

Scales	Description (year)
1	≤ 2008
2	2009 – 2013
3	2014 – 2018
4	2019 – 2023

Table 3. Scales of books borrowed

Scales	Description (number)
1	≤5
2	6 – 15
3	16 – 20
4	21 – 25
5	25 ≤

Table 4. Scales of Unborrowed Book Stocks

Scales	Description (number)
1	≤ 5 copies
2	6 – 10 copies
3	11 – 20 copies
4	21 – 30 copies
5	30 – 45 copies

Table 5 is an alternative data set for 6 (six) sample book titles.

Table 5. Alternatif (Book Data)

Book Titles	Year of Publication (C1)	Borrowed books (C2)	Unborrowed Book Supplies (C3)
Falsafah dan teori dalam keperawatan : Berdasarkan kurikulum terbaru AIPNI 2015 / Brajakson	2017	21 times borrowed	25 copies
Manajemen Keperawatan : Aplikasi dalam praktek Keperawatan Profesional / Nursalam	2018	23 times borrowed	30 copies
Statistik untuk penelitian kesehatan : Deskriptif, inferensial, parametrik dan non parametrik / Aris Santjaka	2011	1 time borrowed	20 copies
Gangguan metabolik & Endoktrin, Penyakit darah, Gangguan ginjal & Saluran perkemihan, gangguan reproduksi wanita, ortopedik	2018	3 times borrowed	10 copies
Pedoman asuhan klien anak-dewasa : Integumen, infeksi sistemik & gangguan imunologi, umum / Marilynn E. Doenges	2018	17 times borrowed	30 copies
Metodologi riset keperawatan / Rian Adi pamungkas	2017	10 times borrowed	35 copies

Table 6 displays the normalization of the criteria data matrix.

Table 6. Normalization of The Criteria Data Matrix

Book Titles	Year of Publication (C1)	Borrowed books (C2)	Unborrowed Book Supplies (C3)
Falsafah dan teori dalam keperawatan : Berdasarkan kurikulum terbaru AIPNI 2015 / Brajakson	3	4	4
Manajemen Keperawatan : Aplikasi dalam praktek Keperawatan Profesional / Nursalam	3	4	4
Statistik untuk penelitian kesehatan : Deskriptif, inferensial, parametrik dan non parametrik / Aris Santjaka	2	1	3
Gangguan metabolik & Endoktrin, Penyakit darah,	3	1	2

Book Titles	Year of Publication (C1)	Borrowed books (C2)	Unborrowed Book Supplies (C3)
Gangguan ginjal & Saluran perkemihan, gangguan reproduksi wanita, ortopedik			
Pedoman asuhan klien anak-dewasa : Integumen, infeksi sistemik & gangguan imunologi, umum / Marilynn E. Doenges	3	3	4
Metodologi riset keperawatan / Rian Adi pamungkas	3	2	5

The formula below determines the accumulation value for the symbol X_n on each criterion, which is obtained from the value present in the alternative data (book data). Table 6 shows the normalization of the criteria data matrix:

$$X_n = \sqrt{\sum_{i=1}^{m} x_{ij}^2} \quad (8)$$

X1 (C1) = √ ((3)^2 + (3)^2 + (2)^2 + (3)^2 + (3)^2 + ……. + (3)^2) = 19.49

X2 (C2) = √ ((4)^2 + (4)^2 + (1)^2 + (1)^2 + (3)^2 + ……. + (2)^2) = 18.41

X3 (C3) = √ ((4)^2 + (4)^2 + (3)^2 + (2)^2 + (4)^2 + ……. + (5)^2) = 24.56

Once the cumulative value of each criterion, or X_n, is determined, the matrix is normalized using the equation's formula. (1).

R_{11} = 3/19.49 = 0.15 | R_{21} = 4/18.41 = 0.22 | R_{31} = 4/24.56 = 0.16

R_{12} = 3/19.49 = 0.15 | R_{22} = 4/18.41 = 0.22 | R_{32} = 4/24.56 = 0.16

R_{13} = 2/19.49 = 0.1 | R_{23} = 1/18.41 = 0.05 | R_{33} = 3/24.56 = 0.12

R_{14} = 3/19.49 = 0.15 | R_{24} = 1/18.41 = 0.05 | R_{34} = 2/24.56 = 0.08

R_{15} = 3/19.49 = 0.15 | R_{25} = 3/18.41 = 0.16 | R_{35} = 4/24.56 = 0.16

R_{16} = 3/19.49 = 0.15 | R_{26} = 2/18.41 = 0.11 | R_{36} = 5/24.56 = 0.2

Each alternative data criteria value is divided by the criteria accumulation value X_n. R_1 is the first criterion, R_2 is the second, and R_3 is the third.

Table 7. Results of Matrix Normalization Calculation

Book Titles	Year of Publication (C1)	Borrowed books (C2)	Unborrowed Book Supplies (C3)
Falsafah dan teori dalam keperawatan : Berdasarkan kurikulum terbaru AIPNI 2015 / Brajakson	0.15	0.22	0.16
Manajemen Keperawatan : Aplikasi dalam praktek Keperawatan Profesional / Nursalam	0.15	0.22	0.16
Statistik untuk penelitian kesehatan : Deskriptif, inferensial, parametrik dan non parametrik / Aris Santjaka	0.1	0.05	0.12
Gangguan metabolik & Endoktrin, Penyakit darah, Gangguan ginjal & Saluran perkemihan, gangguan reproduksi wanita, ortopedik	0.15	0.05	0.08
Pedoman asuhan klien anak-dewasa : Integumen, infeksi sistemik & gangguan imunologi, umum / Marilynn E. Doenges	0.15	0.16	0.16
Metodologi riset keperawatan / Rian Adi pamungkas	0.15	0.11	0.2

The next step involves normalizing the valued according to specific criteria, such as the year of publication percentage of 30% (0.3), the borrowed books number of 40% (0.4), and the book volume stock of 30% (0.3). All of which are associated with the benefit type. The difference between benefit and cost is that if the criterion is a benefit, then the process of calculating the standardization valued is multiplied by 1 (+), whereas if it is a cost, then it will be multiplied by -1 (-) using the equation formula (2).

Y_{11} = 0.3*0.15*1 = 0.04 | Y_{21} = 0.4*0.22*1 = 0.09 | Y_{31} = 0.3*0.16* (-1) = -0.05

Y_{12} = 0.3*0.15*1 = 0.04 | Y_{22} = 0.4*0.22*1 = 0.09 | Y_{32} = 0.3*0.16* (-1) = -0.05

Y_{13} = 0.3*0.01*1 = 0.03 | Y_{23} = 0.4*0.05*1 = 0.02 | Y_{33} = 0.3*0.12*(-1) = -0.04

Y_{14} = 0.3*0.15*1 = 0.04 | Y_{24} = 0.4*0.05*1 = 0.02 | Y_{34} = 0.3*0.08*(-1) = -0.02

Y_{15} = 0.3*0.15*1 = 0.04 | Y_{25} = 0.4*0.16*1 = 0.06 | Y_{35} = 0.3*0.16*(-1) = -0.05

Y_{16} = 0.3*0.15*1 = 0.04 | Y_{26} = 0.4*0.11*1 = 0.04 | Y_{36} = 0.3*0.2 *(-1) = -0.06

The above result is presented into Table 8 as follows:

Table 8. Scale Normalization Results

Book Titles	Year of Publication (C1)	Borrowed books (C2)	Unborrowed Book Supplies (C3)
Falsafah dan teori dalam keperawatan : Berdasarkan kurikulum terbaru AIPNI 2015 / Brajakson	0.04	0.09	-0.05
Manajemen Keperawatan : Aplikasi dalam praktek Keperawatan Profesional / Nursalam	0.04	0.09	-0.05
Statistik untuk penelitian kesehatan : Deskriptif, inferensial, parametrik dan non parametrik / Aris Santjaka	0.03	0.02	-0.04
Gangguan metabolik & Endoktrin, Penyakit darah, Gangguan ginjal & Saluran perkemihan, gangguan reproduksi wanita, ortopedik	0.04	0.02	-0.02
Pedoman asuhan klien anak-dewasa : Integumen, infeksi sistemik & gangguan imunologi, umum / Marilynn E. Doenges	0.04	0.06	-0.05
Metodologi riset keperawatan / Rian Adi pamungkas	0.04	0.04	-0.06

The next step involves determining the positive ideal solution values (MAX) and negative ideal solution values (MIN) from the scale normalization values calculated using equations (3) and (4). The symbols for max value is +A and the symbols for min value is –A.

Table 9. Ideal Solution Value

Code	Criteria	MAX (+A)	MIN (-A)
C1	Year of Publication	0.06	0.02
C2	Borrowed books	0.09	0.02
C3	Book Stock	-0.02	-0.06

After knowing each ideal solution on the criteria, the next step is to calculate the interval between positive and negative ideal solutions on alternatives using the following equations (5) and (6):

Positive ideal solution interval:

D_1+ = √ ((0.06-0.04)^2 + (0.09-0.09)^2 + (-0.02-(-0.05))^2) = 0.04

D_2+ = √ ((0.06-0.04)^2 + (0.09-0.09)^2 + (-0.02-(-0.05))^2) = 0.04

D_3+ = √ ((0.06-0.03)^2 + (0.09-0.02)^2 + (-0.02-(-0.04))^2) = 0.08

D_4+ = √ ((0.06-0.04)^2 + (0.09-0.02)^2 + (-0.02-(-0.02))^2) = 0.07

D_5+ = √ ((0.06-0.04)^2 + (0.09-0.06)^2 + (-0.02-(-0.05))^2) = 0.05

$D_6+ = \sqrt{((0.06-0.04)^2 + (0.09-0.04)^2 + (-0.02-(-0.06))^2)} = 0.07$

Negative ideal solution interval:

$D_1- = \sqrt{((0.02-0.04)^2 + (0.02-0.09)^2 + (-0.06-(-0.05))^2)} = 0.07$

$D_2- = \sqrt{((0.02-0.04)^2 + (0.02-0.09)^2 + (-0.06-(-0.05))^2)} = 0.07$

$D_3- = \sqrt{((0.02-0.03)^2 + (0.02-0.02)^2 + (-0.06-(-0.04))^2)} = 0.02$

$D_4- = \sqrt{((0.02-0.04)^2 + (0.02-0.02)^2 + (-0.06-(-0.02))^2)} = 0.04$

$D_5- = \sqrt{((0.02-0.04)^2 + (0.02-0.06)^2 + (-0.06-(-0.05))^2)} = 0.05$

$D_6- = \sqrt{((0.02-0.04)^2 + (0.02-0.04)^2 + (-0.06-(-0.06))^2)} = 0.03$

The above values are shown in Table 10 below:

Table 10. Ideal Solution interval

Book Titles	Positive interval: (D+)	Negative interval: (D-)
Falsafah dan teori dalam keperawatan : Berdasarkan kurikulum terbaru AIPNI 2015 / Brajakson	0.04	0.07
Manajemen Keperawatan : Aplikasi dalam praktek Keperawatan Profesional / Nursalam	0.04	0.07
Statistik untuk penelitian kesehatan : Deskriptif, inferensial, parametrik dan non parametrik / Aris Santjaka	0.08	0.02
Gangguan metabolik & Endoktrin, Penyakit darah, Gangguan ginjal & Saluran perkemihan, gangguan reproduksi wanita, ortopedik	0.07	0.04
Pedoman asuhan klien anak-dewasa : Integumen, infeksi sistemik & gangguan imunologi, umum / Marilynn E. Doenges	0.05	0.05
Metodologi riset keperawatan / Rian Adi pamungkas	0.07	0.03

The next step is to determine the preference value for each alternative data using equation (7), which is shown in Table 11 below:

V1 = 0.07 / (0.07+0.04) = 0.64

V2 = 0.07 / (0.07+0.04) = 0.64

V3 = 0.02 / (0.02+0.08) = 0.2

V4 = 0.04 / (0.04+0.07) = 0.36

V5 = 0.05 / (0.05+0.05) = 0.5

V6 = 0.03/ (0.03+0.07) = 0.3

Table 11. Alternative Data Preference Value

Book Titles	Preference Value (V)
Falsafah dan teori dalam keperawatan : Berdasarkan kurikulum terbaru AIPNI 2015 / Brajakson	0.64
Manajemen Keperawatan : Aplikasi dalam praktek Keperawatan Profesional / Nursalam	0.64
Statistik untuk penelitian kesehatan : Deskriptif, inferensial, parametrik dan non parametrik / Aris Santjaka	0.2
Gangguan metabolik & Endoktrin, Penyakit darah, Gangguan ginjal & Saluran perkemihan, gangguan reproduksi wanita, ortopedik	0.36
Pedoman asuhan klien anak-dewasa : Integumen, infeksi sistemik & gangguan imunologi, umum / Marilynn E. Doenges	0.5
Metodologi riset keperawatan / Rian Adi pamungkas	0.3

Before determining the spacing, it is necessary to set a limit for each value. If the preference value is in the range of 0.60 above, then it will be classified in the acquisition category; if it is within the range of 0.30 below, then it is classified in the updated category. If the value is between 0.31 and 0.59, then the book does not belong in the update and condition category.

Table 12. Data Rank

Category	Scale
Book Update	≤0.30
Book Procurement	0.60 ≤
Fixed book	0.31 - 0.59

Table 13 indicates the compilation results for the book's title to be purchased, updated, and not included in the category of update and Procurement.

Table 13. Data Rank Result

No	Book Titles	Preference Value (V)
	Procurement	
1	Falsafah dan teori dalam keperawatan : Berdasarkan kurikulum terbaru AIPNI 2015 / Brajakson	0.64
2	Manajemen Keperawatan : Aplikasi dalam praktek Keperawatan Profesional / Nursalam	0.64
	Update	
3	Statistik untuk penelitian kesehatan : Deskriptif, inferensial, parametrik dan non parametrik / Aris Santjaka	0.2
4	Metodologi riset keperawatan / Rian Adi pamungkas	0.3
	Fixed Book	
5	Gangguan metabolik & Endoktrin, Penyakit darah, Gangguan ginjal & Saluran perkemihan, gangguan reproduksi wanita, ortopedik	0.36
6	Pedoman asuhan klien anak-dewasa : Integumen, infeksi sistemik & gangguan imunologi, umum / Marilynn E. Doenges	0.5

Table 13 above shows that, out of 6 samples of book data, 2 (two) belong to the procurement category, 2 (two) belong to the updating category, and 2 (two) have not been updated or procured.

IV. CONCLUSION

The following are the conclusions drawn from the explanation above, UML-based design tool generates *use case diagrams* (admin) and *class diagrams* (17 tables).The ranking results of 6 (six) book samples reveal that 2 (two) categorized into *the procurement category* with a preference value (v) of 0.64, 2 (two) categorized into *the updating category* with a preference value (v) of 0.2 and 0.3, and 2 (two) categorized into the category where *book updates and procurement do not occur*, with preference values (v) of 0.36 and 0.5.

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