

Implementation of the Topsis Method in a Digital Book Collection Management Information System to Support School Digital Transformation: A Case Study of SMK Nusa Bangsa

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Abstract

Libraries play an important role in supporting educational activities and providing access to information. As technology continues to advance, library management needs to transform into a digital system to make services more effective and accessible. Based on observations conducted at SMK Nusa Bangsa, several challenges were identified, including slow book borrowing processes, difficulties in monitoring book collections, delays in book returns, and low student interest in visiting the library. This study developed a web-based digital book collection management information system by implementing the Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) method to assist in determining priorities for book collection management. The implementation results indicate that the system improves the efficiency of library management, accelerates the borrowing process, and facilitates students and teachers in accessing information about book collections. Therefore, the proposed system is expected to support the school's digital transformation and enhance the quality of library services at SMK Nusa Bangsa.

Keyword: Information System, Digital Book Collection Management, TOPSIS, Digital Transformation.

1. Introduction

Libraries play an important role in supporting teaching and learning activities by providing learning resources and information services. The rapid advancement of information technology encourages schools to transform conventional library management into digital systems that improve service quality, operational efficiency, and accessibility to information. However, many school libraries still rely on manual processes, resulting in inefficient book circulation, difficulties in monitoring collections, and limited access to library information. Based on observations conducted at SMK Nusa Bangsa from January to March 2026, book borrowing, returning, and collection management are still performed manually. These conditions often lead to recording errors, overdue returns, difficulties in monitoring book utilization, and limited information regarding book availability. Furthermore, the existing library system has not provided analytical features to support librarians in recommending books based on users' borrowing activities.

Previous studies have developed web-based library information systems to improve library administration [2], [3]. Other studies implemented the Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) method to support book procurement decisions [1], [4]. However, these studies generally focus either on library management systems or decision support systems separately. The integration of a web-based library information system with the TOPSIS method to generate objective book recommendations based on user ratings, borrowing frequency, and the number of borrowers has not been widely discussed. Therefore, this study develops a web-based Digital Book Collection Management Information System integrated with the TOPSIS method. The proposed system is expected to improve library management efficiency, assist librarians in evaluating book collections, provide objective book recommendations, and support the digital transformation of library services at SMK Nusa Bangsa.

2. Page layout

2.1. Digital Library Information System

An information system is an integrated system consisting of people, hardware, software, databases, and communication networks that processes data into useful information to support organizational operations and decision-making. The implementation of information systems enables organizations to manage information more efficiently, accurately, and systematically [5].

In the educational sector, library information systems are developed to manage library collections and services digitally. According to Law of the Republic of Indonesia No. 43 of 2007 concerning Libraries, libraries are responsible for managing printed, recorded, and digital collections to support education, research, and information services. The integration of web-based information systems into library management improves book circulation, collection monitoring, and information accessibility while supporting the digital transformation of educational institutions [6].

2.2. Decision Support System

A Decision Support System (DSS), or Sistem Pendukung Keputusan (SPK), is a computer-based information system designed to assist decision-makers in solving semi-structured and unstructured problems through data processing and analytical models. Rather than replacing human judgment, a DSS provides objective information and alternative solutions to improve the effectiveness and accuracy of decision-making [7], [8].

A DSS generally consists of three main components: data management, model management, and a user interface. These components enable the system to store and process data, apply analytical methods, and present recommendation results interactively to users. Consequently, DSS has been widely implemented in various domains, including education, business, healthcare, and public services, particularly for multi-criteria decision-making problems [8].

In library management, a DSS can support book collection evaluation and recommendation by analyzing multiple criteria simultaneously. Through the integration of the Technique for Order Preference by Similarity to Ideal Solution (TOPSIS), the system is capable of ranking books based on user ratings, the number of borrowers, and borrowing frequency. This approach assists librarians in recommending relevant books and supporting collection management through objective and data-driven decision-making.

2.3. Technique for Order Preference by Similarity to Ideal Solution (TOPSIS)

Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) is a Multi-Criteria Decision-Making (MCDM) method introduced by Hwang and Yoon in 1981 to rank alternatives based on multiple evaluation criteria [9]. The fundamental principle of TOPSIS is to select the alternative with the shortest distance from the positive ideal solution and the farthest distance from the negative ideal solution. Due to its simple computational process, objective evaluation mechanism, and consistent ranking results, TOPSIS has been widely applied in decision support systems across various domains, including education and library management [10]. In this study, TOPSIS is integrated into a web-based digital library information system to recommend book collections. The recommendation process is based on three benefit criteria: user rating, number of borrowers, and borrowing frequency. The criteria and their corresponding weights are presented in Table 1.

Table 1. Evaluation Criteria

Criteria	Weight	Type
User Rating	0.40	Benefit
Number of Borrowers	0.30	Benefit
Borrowing Frequency	0.30	Benefit

The TOPSIS procedure consists of six main stages: (1) constructing the decision matrix, (2) normalizing the decision matrix, (3) calculating the weighted normalized matrix, (8) determining the positive and negative ideal solutions, (9) calculating the Euclidean distances to both ideal solutions, and (10) computing the preference value for ranking alternatives. The normalized decision matrix is calculated using Equation (1).

Normalized Decision Matrix

$$r_{ij} = \frac{x_{ij}}{\sqrt{\sum_{i=1}^m x_{ij}^2}}$$

Description:

- r_{ij} = normalized value
- x_{ij} = value of alternative (i) for criterion (j)
- m = number of alternatives

Weighted Normalized Matrix

$$y_{ij} = w_j \times r_{ij}$$

Description:

- a. y_{ij} = weighted normalized value
- b. w_j = weight of criterion (j)
- c. r_{ij} = normalized value

Determination of the Positive Ideal Solution and Negative Ideal Solution

Positive Ideal Solution:

$$A^+ = \{\max(y_{ij}) \mid j = 1, 2, \dots, n\}$$

Negative Ideal Solution:

$$A^- = \{\min(y_{ij}) \mid j = 1, 2, \dots, n\}$$

Calculation of the Distance to the Ideal Solution

Distance to the Positive Ideal Solution:

$$D_i^+ = \sqrt{\sum_{j=1}^n (y_{ij} - y_j^+)^2}$$

Distance to the Negative Ideal Solution:

$$D_i^- = \sqrt{\sum_{j=1}^n (y_{ij} - y_j^-)^2}$$

Description:

- D_i^+ = distance of alternative (i) from the positive ideal solution
- D_i^- = distance of alternative (i) from the negative ideal solution

Preference Value Calculation

The preference value is used to determine the recommendation level of each alternative.

$$V_i = \frac{D_i^-}{D_i^- + D_i^+}$$

Description:

- V_i = preference value of alternative (i)
- D_i^- = distance to the negative ideal solution
- D_i^+ = distance to the positive ideal solution

2.4. Waterfall Model

The Waterfall model is a sequential software development methodology in which each development phase must be completed before proceeding to the next stage. This approach provides a structured framework for software development, ensuring that system requirements, design, implementation, testing, and maintenance are performed systematically and well documented [11].

The Waterfall model is widely adopted in information system development because of its clear workflow and ease of project management, particularly when system requirements have been identified at the beginning of the development process [12]. In this study, the Waterfall model was selected because the functional requirements of the web-based digital library information system had been clearly defined through observation and requirement analysis at SMK Nusa Bangsa.

The development process consists of five sequential phases: requirement analysis, system design, implementation, testing, and maintenance. Requirement analysis identifies user needs and system functionalities. The design phase defines the system architecture, database structure, and user interface. During implementation, the system is developed using the selected programming technologies. The testing phase evaluates system functionality to ensure that all features operate according to the specified requirements, while the maintenance phase focuses on correcting errors and improving system performance after deployment. This structured development process facilitates systematic implementation and improves the quality of the resulting information system.

3. Research Methods

All paragraphs must be justified alignment. With justified alignment, both sides of the paragraph are straight.

3.1. Research Design

This study employed a quantitative research approach to develop and evaluate a web-based digital library information system integrated with the Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) method. The proposed system aims to support librarians in recommending book collections based on multiple evaluation criteria. System development followed the Waterfall software development model to ensure a structured and systematic implementation process.

3.2. Research Site and Data Collection

The research was conducted at SMK Nusa Bangsa, Kemang, Bogor, West Java, Indonesia, from October 2025 to March 2026. Data collection was carried out through direct observation of library activities and interviews with the librarian to identify existing problems, system requirements, and book management procedures. The collected information served as the basis for designing and developing the proposed digital library information system.

The TOPSIS evaluation utilized a testing dataset consisting of 25 selected book records. These data were used solely to validate the recommendation process and evaluate the performance of the proposed method, rather than representing the entire library collection.

3.3. System Development Method

The system was developed using the Waterfall model, which consists of five sequential phases: requirement analysis, system design, implementation, testing, and maintenance. Requirement analysis was conducted to identify functional and non-functional system requirements based on observations and interviews. The design phase included database design, system architecture, and user interface design. The implementation phase involved developing the application using PHP, MySQL, and JavaScript. System functionality was then verified through Black Box Testing, while the maintenance phase focused on future improvements and system updates after deployment.

3.4. TOPSIS Implementation

The TOPSIS method was implemented to generate book recommendations based on user borrowing activities. Three benefit criteria were employed in the evaluation process: user rating (0.40), number of borrowers (0.30), and borrowing frequency (0.30). The recommendation process consisted of constructing the decision matrix, normalizing the decision matrix, calculating the weighted normalized matrix, determining the positive and negative ideal solutions, computing the Euclidean distances, and calculating preference values to rank the book alternatives. The resulting rankings were used as the basis for recommending books within the digital library system.

4. Results and Discussion

This section presents the results of implementing the proposed web-based digital library information system integrated with the TOPSIS method. The discussion includes the TOPSIS calculation process, book recommendation results, system implementation, and functional verification. The recommendation results are generated automatically based on three evaluation criteria: user rating, number of borrowers, and borrowing frequency.

4.1. Criteria Determination

The TOPSIS method was applied using three benefit criteria that represent the utilization level of library collections. These criteria consist of user rating (C1), number of borrowers (C2), and borrowing frequency (C3). The assigned weights were 0.40, 0.30, and 0.30, respectively. The evaluation criteria are presented in Table 2.

Table 2. Evaluation Criteria

Code	Criterion	Type	Weight
C1	Book Rating	Benefit	0,40
C2	Number of Borrowers	Benefit	0,30
C3	Total Borrowings	Benefit	0,30

4.2. Decision Matrix

A testing dataset consisting of 10 representative book alternatives was used to demonstrate the TOPSIS calculation process. Each alternative contains historical data on user ratings, number of borrowers, and borrowing frequency. The decision matrix is presented in Table 3.

Table 3. Decision Matrix

Alternative	Book Title	C1 (Rating)	C2 (Number of Borrowers)	C3 (Total Borrowings)
A1	Teknik Komputer dan Jaringan	4,82	11	13
A2	IPAS - Rumpun Teknologi	4,40	5	5
A3	Matematika	4,67	3	3
A4	Matematika	4,33	3	3
A5	English	4,00	3	3

Alternative	Book Title	C1 (Rating)	C2 (Number of Borrowers)	C3 (Total Borrowings)
A6	English	4,50	2	2
A7	Bahasa Indonesia	4,00	2	2
A8	Bahasa Indonesia	4,00	1	1
A9	Pendidikan Pancasila	4,00	1	1
A10	IPAS - Rumpun Bisnis	0,00	1	1

To eliminate differences in measurement scales among the criteria, the decision matrix was normalized using vector normalization. The normalized values are shown in Table 4.

Table 4. Normalized Decision Matrix

Alternative	C1	C2	C3
A1	0,3999	0,8108	0,8705
A2	0,3651	0,3686	0,3348
A3	0,3875	0,2212	0,2009
A4	0,3593	0,2212	0,2009
A5	0,3319	0,2212	0,2009
A6	0,3734	0,1474	0,1339
A7	0,3319	0,1474	0,1339
A8	0,3319	0,0737	0,0670
A9	0,3319	0,0737	0,0670
A10	0,0000	0,0737	0,0670

4.3. Weighted Normalized Matrix

The normalized values were multiplied by the corresponding criterion weights to obtain the weighted normalized matrix. This matrix represents the contribution of each criterion to every book alternative and serves as the basis for determining the positive and negative ideal solutions. The weighted normalized matrix is presented in Table 5.

Table 5. Weighted Normalized Matrix

Alternative	C1	C2	C3
A1	0,1490	0,2433	0,2560
A2	0,1360	0,1106	0,0985
A3	0,1444	0,0663	0,0591
A4	0,1339	0,0663	0,0591
A5	0,1237	0,0663	0,0591
A6	0,1391	0,0442	0,0394
A7	0,1237	0,0442	0,0394
A8	0,1237	0,0221	0,0197
A9	0,1237	0,0221	0,0197
A10	0,0000	0,0221	0,0197

4.4. Positive and Negative Ideal Solutions

The positive ideal solution (A^+) and negative ideal solution (A^-) were determined from the weighted normalized matrix. Since all criteria are classified as benefit criteria, the positive ideal solution consists of the maximum value for each criterion, while the negative ideal solution consists of the minimum value. These reference values were subsequently used to calculate the separation distance of each alternative from the ideal solutions.

4.5. Separation Distance Calculation

The Euclidean distance of each book alternative to the positive ideal solution (D^+) and the negative ideal solution (D^-) was calculated. These distances indicate the closeness of each alternative to the ideal solution. The calculation results are summarized in Table 6 and Table 7.

Table 6. Positive Separation Distance

Alternative	D^+
A1	0,0000
A2	0,2064
A3	0,2648
A4	0,2652
A5	0,2660
A6	0,2944
A7	0,2953
A8	0,3247
A9	0,3247
A10	0,3563

Tabel 7. Negative Separation Distance

Alternative	D ⁻
A1	0,3563
A2	0,1804
A3	0,1561
A4	0,1464
A5	0,1371
A6	0,1422
A7	0,1272
A8	0,1237
A9	0,1237
A10	0,0000

4.6. Preference Value and Ranking

The preference value of each alternative was calculated using the obtained separation distances. A higher preference value indicates that the book is more suitable for procurement recommendation. The ranking results are presented in Table 8.

Table 8. Preference Values and Ranking

Alternative	Book Title	Preference Value (V)
A1	Teknik Komputer dan Jaringan	1,0000
A2	IPAS - Rumpun Teknologi	0,4935
A3	Matematika	0,3902
A4	Matematika	0,3774
A5	English	0,3641
A6	English	0,3394
A7	Bahasa Indonesia	0,3171
A8	Bahasa Indonesia	0,2814
A9	Pendidikan Pancasila	0,2814
A10	IPAS - Rumpun Bisnis	0,0767

The results show that Teknik Komputer dan Jaringan obtained the highest preference value ($V = 1.0000$), making it the highest-priority recommendation for book procurement. In contrast, IPAS – Rumpun Bisnis obtained the lowest preference value ($V = 0.0767$), indicating the lowest procurement priority among the evaluated alternatives. These findings demonstrate that the proposed TOPSIS method can objectively rank books according to user ratings, the number of borrowers, and borrowing frequency.

4.7. System Implementation

A web-based digital library information system was successfully developed to support book management and procurement recommendations. The system provides features for user authentication, book borrowing, rating submission, recommendation generation, and report management.

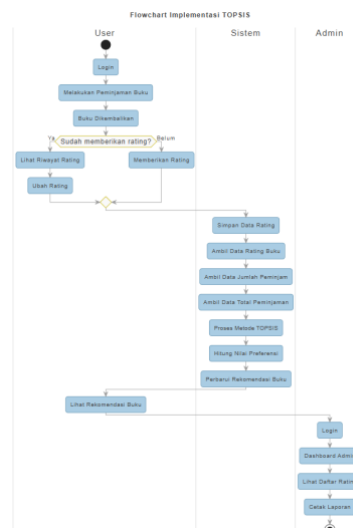
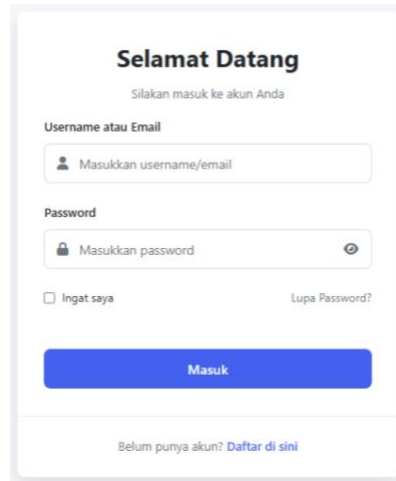
**Fig. 1:** TOPSIS Implementation Flowchart

Figure 1 illustrates the workflow of the TOPSIS method integrated into the digital library information system, beginning with data collection from user activities, followed by TOPSIS calculations, and ending with the generation of book procurement recommendations.



Selamat Datang
Silakan masuk ke akun Anda

Username atau Email

Password

☐ Ingat saya [Lupa Password?](#)

Masuk

Belum punya akun? [Daftar di sini](#)

Fig. 2. User Login Page

Figure 2 presents the login interface that authenticates registered users before accessing the digital library system.

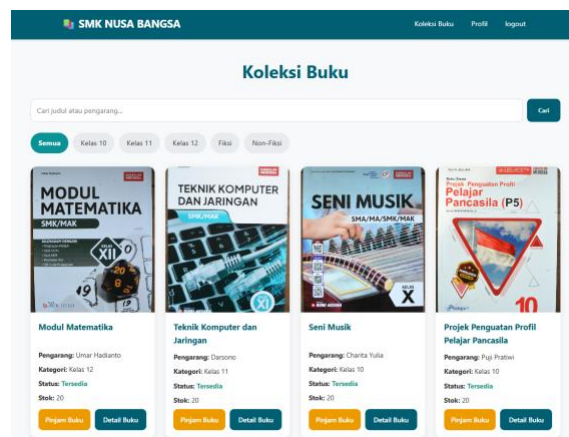
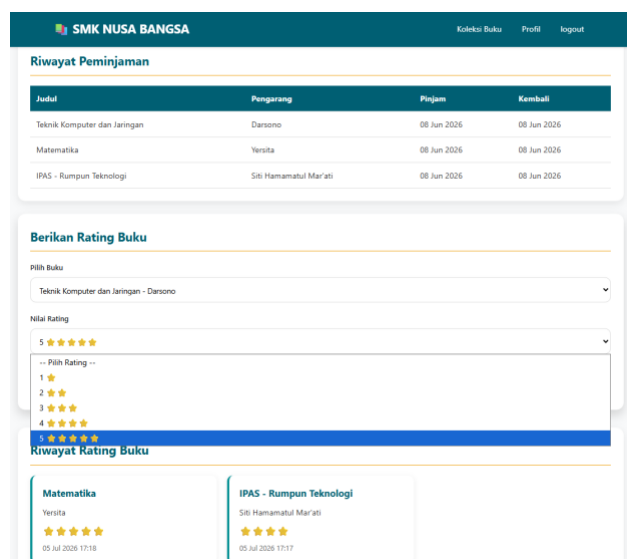


Fig. 3. Book Borrowing Page

Figure 3 shows the borrowing interface where users can select available books and submit borrowing requests through the system.



SMK NUSA BANGSA Koleksi Buku Profil Logout

Riwayat Peminjaman

Judul	Pengarang	Pinjam	Kembali
Teknik Komputer dan Jaringan	Dansono	08 Jun 2026	08 Jun 2026
Matematika	Yersita	08 Jun 2026	08 Jun 2026
IPAS - Rumpun Teknologi	Siti Hamamatul Mar'ati	08 Jun 2026	08 Jun 2026

Berikan Rating Buku

Pilih Buku
 Teknik Komputer dan Jaringan - Dansono

Nilai Rating
 5 ★★★★★

-- Pilih Rating --

1 ★
 2 ★★
 3 ★★★
 4 ★★★★
 5 ★★★★★

Riwayat Rating Buku

Judul	Pengarang	Rating	Tanggal
Matematika	Yersita	★★★★★	05 Jul 2026 17:18
IPAS - Rumpun Teknologi	Siti Hamamatul Mar'ati	★★★★★	05 Jul 2026 17:17

Fig. 4. Book Rating Page

After returning borrowed books, users can submit ratings through the interface shown in Figure 4. These ratings are stored in the database and become one of the evaluation criteria used in the TOPSIS calculation.

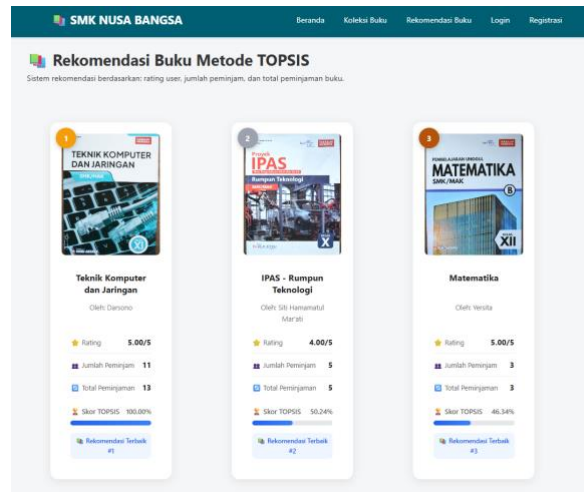


Fig. 5: Book Recommendation Page

Figure 5 displays the recommendation results generated automatically by the TOPSIS method. Books are ranked according to their preference values, allowing librarians to identify procurement priorities efficiently.

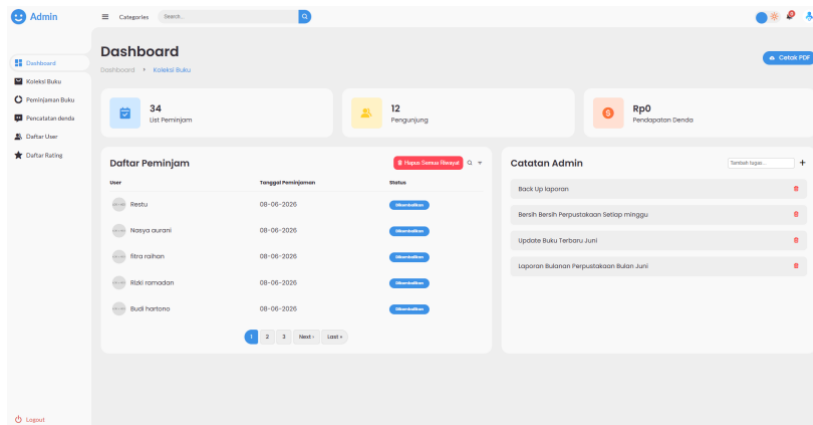


Fig. 6: Administrator Dashboard

Figure 6 presents the administrator dashboard used to manage books, users, borrowing transactions, rating data, recommendation results, and reports.



SMK NUSA BANGSA
PERPUSTAKAAN DIGITAL
Sistem Informasi Perpustakaan Berbasis Web
Kecamatan Kemang, Kabupaten Bogor
LAPORAN DATA RATING BUKU
Dicetak pada 06-07-2026 19:50

31 Total Rating		9 Buku Dirating		11 User Pernah Rating	
No	User	Judul Buku	Pengarang	Rating	Tanggal
1	fitra raihan	Teknik Komputer dan Jaringan	Darsono	5/5	05-07-2026 18:39
2	fitra raihan	Matematika	Yersita	4/5	05-07-2026 18:39
3	inwan kurniawan	Teknik Komputer dan Jaringan	Darsono	5/5	05-07-2026 18:38
4	inwan kurniawan	IPAS - Rumpun Teknologi	Siti Hamamatul Mar'ati	4/5	05-07-2026 18:38
5	inwan kurniawan	English	Ikhwani Muslim	4/5	05-07-2026 18:38
6	Rizki ramadan	Teknik Komputer dan Jaringan	Darsono	5/5	05-07-2026 18:37
7	Rizki ramadan	IPAS - Rumpun Teknologi	Siti Hamamatul Mar'ati	5/5	05-07-2026 18:37
8	Rizki ramadan	Matematika	Yuliatun Aisyah	4/5	05-07-2026 18:36
9	ftriani	Teknik Komputer dan Jaringan	Darsono	4/5	05-07-2026 18:36
10	ftriani	Bahasa Indonesia	Endah Tri	4/5	05-07-2026 18:36
11	ftriani	English	Dendy Desmal	5/5	05-07-2026 18:35
12	Budi hartono	Teknik Komputer dan Jaringan	Darsono	5/5	05-07-2026 18:35
13	Nunung arianti	Teknik Komputer dan Jaringan	Darsono	5/5	05-07-2026 18:34
14	Nunung arianti	English	Ikhwani Muslim	4/5	05-07-2026 18:33

Fig. 7: Rating Management and Report

No	User	Judul Buku	Pengarang	Rating	Tanggal
15	Nunung arianti	Pendidikan Pancasila	Rochimudin	4/5	05-07-2026 18:33
16	fatih andhana	Teknik Komputer dan Jaringan	Darsono	5/5	05-07-2026 18:28
17	fatih andhana	Matematika	Yuliatun Aisyah	4/5	05-07-2026 18:28
18	Rangga utami	IPAS - Rumpun Teknologi	Siti Hamamatul Mar'ati	5/5	05-07-2026 18:25
19	Rangga utami	Teknik Komputer dan Jaringan	Darsono	4/5	05-07-2026 18:25
20	Rangga utami	English	Dendy Desmal	4/5	05-07-2026 18:25
21	Restu	Matematika	Yerita	5/5	05-07-2026 18:18
22	Restu	Teknik Komputer dan Jaringan	Darsono	5/5	05-07-2026 18:18
23	Restu	Bahasa Indonesia	Tilik Harsati	4/5	05-07-2026 18:17
24	maman	Teknik Komputer dan Jaringan	Darsono	5/5	05-07-2026 18:14
25	maman	English	Ikhwan Muslim	4/5	05-07-2026 18:13
26	maman	Matematika	Yuliatun Aisyah	5/5	05-07-2026 18:13
27	Budi hartono	Matematika	Yerita	5/5	05-07-2026 17:18
28	Budi hartono	IPAS - Rumpun Teknologi	Siti Hamamatul Mar'ati	4/5	05-07-2026 17:17
29	Nasya aurani	Teknik Komputer dan Jaringan	Darsono	5/5	05-07-2026 13:26
30	Nasya aurani	IPAS - Rumpun Teknologi	Siti Hamamatul Mar'ati	4/5	05-07-2026 13:26
31	Nasya aurani	Bahasa Indonesia	Endah Tri	4/5	05-07-2026 13:25

Dicetak oleh Admin Perpustakaan

Bogor, 06-07-2026
Kepala Perpustakaan

Fig. 8: Rating Management and Report

Figure 7 and 8 displays all ratings submitted by users after borrowing books. The administrator can review the rating records and generate rating reports. These data are automatically used as one of the input criteria for the TOPSIS recommendation process.

LAPORAN REKOMENDASI PENGADAAN BUKU

Berdasarkan Metode TOPSIS
Dicetak pada 06-07-2026 19:50

HASIL REKOMENDASI PENGADAAN BUKU (TOPSIS)

Rank	Judul Buku	Rating	Peminjam	Total Pinjam	Nilai V
1	Teknik Komputer dan Jaringan	4.82	11	13	1.0000
2	IPAS - Rumpun Teknologi	4.40	5	5	0.4935
3	Matematika	4.67	3	3	0.3902
4	Matematika	4.33	3	3	0.3774
5	English	4.00	3	3	0.3641
6	English	4.50	2	2	0.3394
7	Bahasa Indonesia	4.00	2	2	0.3171
8	Bahasa Indonesia	4.00	1	1	0.2814
9	Pendidikan Pancasila	4.00	1	1	0.2814
10	IPAS - Rumpun Bisnis	0.00	1	1	0.0767

Fig 9: Book Recommendation Report

Figure 9 presents the recommendation report generated automatically by the system. The report summarizes the preference values and ranking results of each book, providing decision support for determining procurement priorities at SMK Nusa Bangsa.

Based on the implementation results, the proposed digital library information system successfully integrates the TOPSIS method to generate book procurement recommendations automatically. User ratings, the number of borrowers, and borrowing frequency are processed to produce objective recommendation rankings. The generated reports assist librarians in determining procurement priorities more efficiently and systematically.

4.8. Functional Verification

The developed system was functionally verified by evaluating each implemented feature to ensure that it operated according to the defined requirements. The verification covered user authentication, book borrowing, rating submission, recommendation generation, report generation, and administrator functions.

Table 9. Functional Verification Results

Feature	Expected Result	Status
User Login	User authentication completed successfully	Successful
Book Borrowing	Borrowing transactions recorded correctly	Successful
Rating Submission	User ratings stored successfully	Successful
TOPSIS Recommendation	Preference values and rankings generated correctly	Successful
Rating Report	Rating report generated successfully	Successful
Recommendation Report	Recommendation report generated successfully	Successful
Administrator Dashboard	All management functions operated correctly	Successful

The functional verification results indicate that all implemented features operated as expected. The system successfully supports digital library management while automatically generating objective book procurement recommendations using the TOPSIS method. This demonstrates that the proposed system is suitable for assisting librarians in managing collections and prioritizing future book procurement.

5. Conclusion

The results of this study demonstrate that the implementation of a web-based digital library information system integrated with the TOPSIS method can effectively support book procurement decision-making in a more objective, efficient, and systematic manner. The recommendation process was carried out based on three evaluation criteria, namely user ratings, the number of borrowers, and borrowing frequency. The TOPSIS method successfully ranked book alternatives according to their preference values, with *Teknik Komputer dan Jaringan* obtaining the highest preference value ($V = 1.0000$), indicating the highest procurement priority. In addition, the developed system successfully supports digital library management through features such as user authentication, book borrowing, rating submission, recommendation generation, and report management. Functional verification also confirmed that all implemented features operated according to the defined requirements.

For future work, the recommendation model can be enhanced by incorporating additional evaluation criteria, such as book publication year, stock availability, and curriculum relevance, to improve recommendation accuracy. Furthermore, future studies may compare the performance of TOPSIS with other multi-criteria decision-making methods, such as AHP, SAW, or MOORA, to identify the most appropriate approach for supporting book procurement decisions in digital library management.

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