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Design and Development of a Web-Based Information System for Sapta Kanda Ramayana Using the Laravel Framework

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Abstract: The Ramayana is a story written by Rsi Valmiki that consists of seven parts called Sapta Kanda. The Ramayana is a cultural heritage rich in knowledge, but faces accessibility challenges in the modern era. This study contributes a novel web-based platform specifically designed to digitize and disseminate the Sapta Kanda Ramayana, integrating bilingual content (Old Javanese and Indonesian) with multi-role user interaction—an approach not found in prior cultural information systems. This development aims to design a website-based information system that can present the Sapta Kanda Ramayana story through a digital and interactive platform. The Laravel framework makes the system development process more structured and efficient. The system development uses the waterfall method, which goes through a series of processes such asnalysis, design, implementation, and testing, so that the system development process runs smoothly. The resulting system includes features for managing Sapta Kanda content, Ramayana characters, and user-contributed content. System testing uses the black box testing method to test system functionality and usability testing with the System Usability Scale (SUS) method to determine user satisfaction levels. The results of the system testing showed that the functionality of the features in the system worked well through black box testing and obtained a score of 85.4 from 21 respondents through testing using the SUS method, which indicates that the developed system is well accepted by users. This study is limited to web-based access and does not yet cover mobile application deployment or offline accessibility.

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INTRODUCTION

Advancing technology has brought many developments for every individual, especially in terms of obtaining information and solving problems. Everyone today certainly cannot escape the use of technology, which not only provides efficiency but also various innovations, especially in the development of software that functions as a platform for disseminating information (Wiryany et al., 2022). Technology is often integrated with other fields to support their sustainability. One field that can be integrated with technology is culture, as an effort to preserve culture by utilizing technology. The integration of technology and culture creates a more interesting relationship that can be easily accessed by many people (Krisnanik et al., 2023). This interesting relationship also presents challenges, especially in preserving cultural identity and its values in the midst of an increasingly modern era.

Indonesia is a country with cultural diversity, one of which is the Ramayana story, which is included in the intangible cultural heritage. Ramayana is a story written by Rsi Valmiki that tells the journey of Rama in facing various obstacles and trials to save his wife, Sita, who was kidnapped by Ravana. The Ramayana story consists of seven parts called Sapta Kanda and is known for its many moral values and life lessons (Hariyanto, 2023). However, as times have progressed, interest in classical literary works such as the Ramayana has declined, causing it to slowly lose its existence. Another factor contributing to this is the lack of structured documentation and conventional methods of delivery, which pose challenges in preserving the culture so that the values contained in the Ramayana story are maintained (Sari et al., 2022).

Web-based information systems have great potential as effective and flexible platforms for delivering information. Web-based information systems allow users to access the information they want anytime and anywhere as long as they are connected to the internet. Previous developments have shown that the application of information systems in the field of culture can improve accessibility to necessary cultural information and enhance the user experience, thereby increasing user interest in the content presented on the system (Ramadhani & Setiawan, 2024). Therefore, the use of web technology can be a solution to disseminating cultural information to a wider audience.

Research on the application of web information systems used as a platform for cultural preservation efforts has been conducted extensively (Apriliyani et al., 2022). However, no research has been found that specifically addresses the Ramayana story in the form of a web-based information system. Research on the Ramayana story has been dominated by theoretical studies such as text analysis, literary comparisons, or the use of conventional learning methods, thus failing to utilize web technology to optimize its delivery and function as an interactive platform (Rachmawati, 2020).

Based on these issues, this study aims to present the Web-Based Sapta Kanda Ramayana Information System as a platform for delivering information as well as an interactive platform for its users. The system is designed not only to present the Ramayana story, but also to provide an interactive experience for users to share and manage structured and easily accessible content. System development uses the Laravel Framework, which has an architecture called Model-View-Controller (MVC) that is capable of producing a structured system. Thus, the use of the Laravel Framework can produce a structured and easy-to-develop system that can support long-term system development (Saefudin et al., 2023).

The novelty of this research lies in the development of a web-based information system that specifically highlights the Ramayana story with a more interesting approach. Unlike previous studies that were dominated by theoretical studies or conventional learning, this study presents an integration between web-based technology and culture, which is expected to attract interest in the classic literary work of the Ramayana story. From a technical standpoint, the system addresses several non-trivial challenges: (1) the integration and structured presentation of bilingual content in Old Javanese and modern Indonesian within a single relational database schema, (2) a multi-role validation workflow involving three distinct user entities (users, resource persons, and admins) with differentiated access rights and content lifecycle management, and (3) a configurable bypass mechanism for content moderation that balances quality control with operational flexibility. These features collectively distinguish this system from generic cultural web applications and represent a meaningful contribution

to the field of digital heritage information systems. The results of this study can provide academic benefits as a reference for the development of cultural information systems and as a reference for cultural education media that is easily accessible to a wide audience.

METHOD

The Waterfall Method was used as the basis for developing this system . This method was selected because the system requirements for presenting Sapta Kanda Ramayana content were well-defined from the outset, making a sequential, phase-by-phase development approach appropriate. The development process involved collaboration with two domain experts in Balinese and Javanese literature as subject matter experts during the analysis phase, as well as three administrative stakeholders who provided input on the content validation workflow. During the database design phase, specific constraints were considered, including the need to store bilingual story content (Old Javanese and Indonesian), manage multiple user role permissions, and support a content moderation lifecycle. (Duma & Pusvita, 2023).

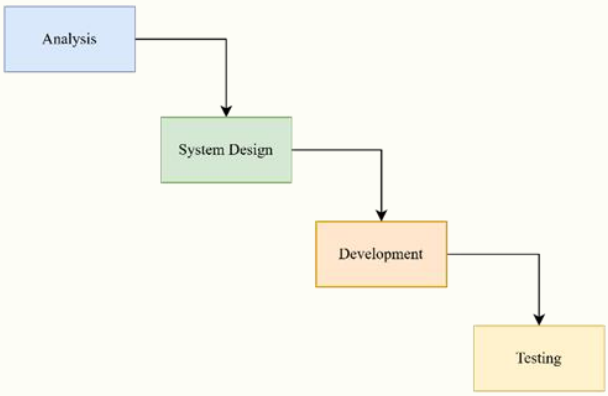

Figure 1. The Waterfall Method

Figure 1 illustrates the series of stages contained in the Waterfall method. The Waterfall method is a system development method that begins with the analysis stage to identify system requirements, system design to determine how data flows within the system, system implementation to apply the design process, and system testing to evaluate system performance (Rahayu et al., 2024). Analysis is the first step in the Waterfall Method, which is carried out by identifying system requirements, such as features and entities involved in the system, in order to obtain a simple overview of the system being created. The system design step is the second step in the Waterfall Method, which is carried out by designing the system, such as designing the system workflow and designing the database used in the system. The implementation step is the third step, which is carried out by applying the Laravel Framework to the general overview of the system and the system workflow so that it becomes a website. The testing step is a step that is conducted by evaluating the system to confirm that the system's functionality is running properly and is acceptable to system users.

The application of the Waterfall Method in this study allows the system development process to run smoothly and be well-documented. Each phase has clear directions, thereby reducing the risk of errors during system development and facilitating the system evaluation process (Seta et al., 2021).

Analysis

The system requirements analysis stage is the first stage of the Waterfall method, which is the basic process of information system development. At this stage, the process is carried out by identifying user requirements and system requirements, such as features, to ensure that the developed system can meet the requirements in accordance with the research objectives (Rajagukguk & Pormes, 2025).

The system requirements analysis in this study focuses on the requirements of an information system that can present the story of Sapta Kanda Ramayana in a structured and easily accessible

manner. The system created not only functions to provide information in the form of Ramayana story content and characters, but also supports interaction between users through content data management. System requirements are compiled by considering the ease of accessing information, the regularity of data processing, and user comfort in using the system. The system requirements analysis phase produces an overview that can be used as a reference in the system design and implementation process. Good analysis results can minimize errors in the system development process so that it meets user requirements and research objectives (Hariwijaya et al., 2022).

System Design

The system design stage is the second step in the Waterfall method. System design is carried out by taking into account the results of previous analyses to produce a design for the structure and workflow of the system before proceeding to the implementation process. System design is carried out with the aim of providing an overview of the system being built so that it meets the needs of system users and is in line with the research objectives (Syahputra & Putri, 2025).

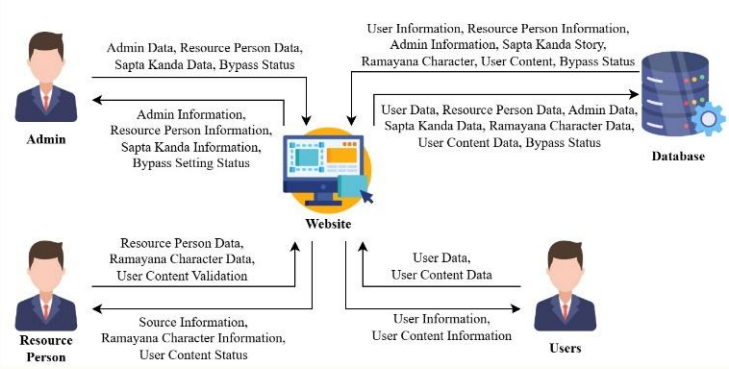

Figure 2. System Overview

The previous analysis process produced a system overview, showing that the Web-Based Sapta Kanda Ramayana Information System is designed to manage and present information in the form of Sapta Kanda Ramayana story content, Ramayana characters, and interactive features for users. The results of the system design show that there are several entities involved in the use of the system, including users, admins, and resource persons, each with their own roles in the system. Entities such as admins and resource persons have roles in managing and validating the content available on the system. Each entity is interconnected to support the content management process and structured information presentation. This system allows users to access information about the Sapta Kanda Ramayana stories, information about Ramayana characters, and manage uploaded content such as side stories, story videos, and character suggestions.

Development

The development stage is a follow-up stage carried out after the system design process is complete. The system development process involves applying the design stage to the information system. The Sapta Kanda Ramayana Information System was created as a website that uses the Laravel Framework. The Laravel Framework has a structured development architecture with a Model-View-Controller (MVC) pattern, so that the process can be carried out efficiently and in a structured manner (Naofal et al., 2022). The development of the system using the Laravel Framework begins with the model, which is used to process data to be stored in the database, the view, which functions to display the user interface, and the controller, which is used to manage the logic running on the website and as a bridge between the Model and the View.

The main features of the Sapta Kanda Ramayana Information System include the presentation of Sapta Kanda Ramayana story content management, Ramayana character data management, and features involving user interaction, such as content upload management. The implemented system is capable of distinguishing the access rights of each entity involved in the system, namely users, resource

persons, and admins, thereby enabling content management and validation to be carried out correctly and in a structured manner. The developed system processes and stores system data using a MySQL database. MySQL, as a relational database, makes data management more structured, thus simplifying the data management process in developing web-based information systems (Ramadha, 2022).

Testing

System testing is a stage that is carried out after the system implementation process is complete. System testing is carried out to ensure that every feature and flow in the Sapta Kanda Ramayana Information System runs according to expectations and requirements. The system testing methods used to test the Sapta Kanda Ramayana Information System are black box testing and the System Usability Scale (SUS). These testing methods aim to identify and evaluate the system in terms of functionality and ease of use experience(Kholifah et al., 2023).

The Black Box Testing method is used to identify and evaluate each feature in the information system by providing input and observing the output generated by the system to ensure that it runs according to the designed requirements (Lubis & Ginting, 2024).

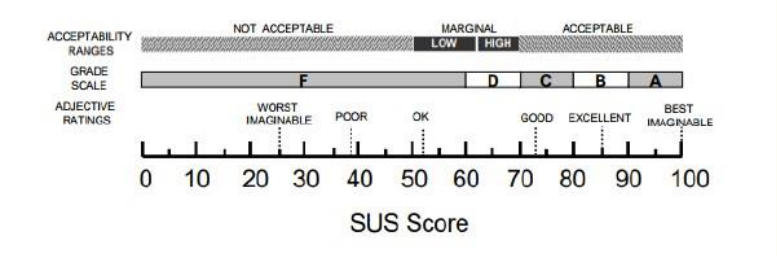

Figure 3. SUS Method Rating Scale

Usability testing is the second testing method used to test systems using the SUS method. This test assesses user satisfaction and ease of use of the system. The SUS method is one of the commonly used testing methods for testing an information system. Figure 3 shows the classification of SUS scores proposed by Aaron Bangor in his 2009 study. This classification can be used to interpret the SUS scores obtained in testing a system (Bangor et al., 2009). The SUS testing method consists of ten questions with a rating scale of strongly disagree expressed as 1 and strongly agree expressed as 5 (Bilung et al., 2023).

$$x = 2{,}5 \sum_{i=1}^{10} S_i \quad (1)$$

The results obtained from testing using the SUS method are then calculated and processed using the SUS calculation method to obtain the average SUS score. Once all the scores from the respondents have been calculated, the average SUS score is then calculated based on the number of respondents to obtain the final SUS score. The final score obtained is then adjusted to the SUS score rating scale to obtain an overview of user acceptance. System testing using the black box method and System Usability Scale methods is expected to provide an overview and test results of the system in terms of functionality and ease of use (Abdillah et al., 2023).

RESULTS AND DISCUSSIONS

This chapter discusses the results of the system development and testing of the web-based Sapta Kanda Ramayana Information System. This system was implemented by creating an interface for each entity, and testing was conducted using black box and SUS methods.

User Interface

The user interface is a page used by general users to access the Sapta Kanda Ramayana Information System. The user interface includes the user home page, the Sapta Kanda Ramayana page, the Ramayana characters page, and the user content management page. These pages are designed to provide easy access to information and to serve as a page for user interaction to share content.

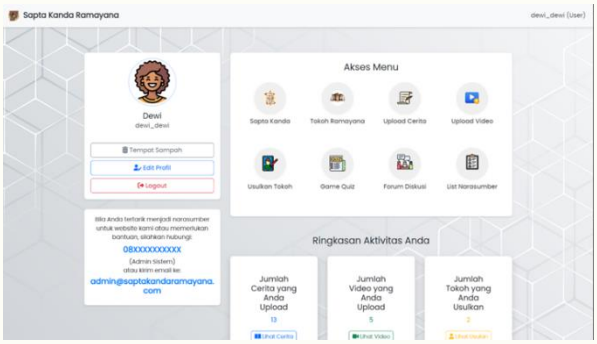

Figure 4. User Dashboard

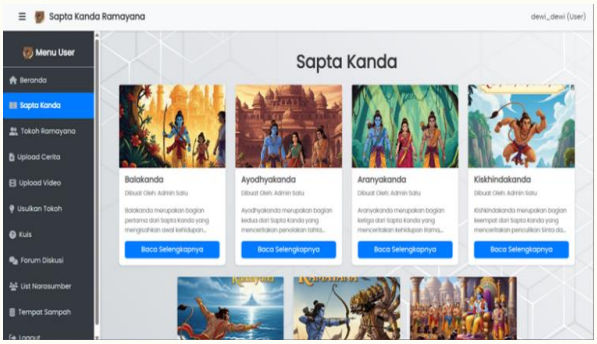

Figure 5. Sapta Kanda Menu Interface

The user dashboard is the main display used by users on the Sapta Kanda Ramayana Information System after successfully logging into the system. The user dashboard page contains various menus that can be accessed by users. This page also displays user profile information such as profile photos, names, and usernames, as well as a summary of activities showing the amount of content uploaded by users, such as side story content, video story content, and character suggestion content. Figure 5 shows the main feature of the Sapta Kanda Ramayana Information System, namely the Sapta Kanda menu. This menu is used by users to access information about Sapta Kanda Ramayana. This page displays the seven parts of the Ramayana story, and users can select the part they want to read, which will then direct them to the page detailing the Kanda they want to read to obtain more detailed information.

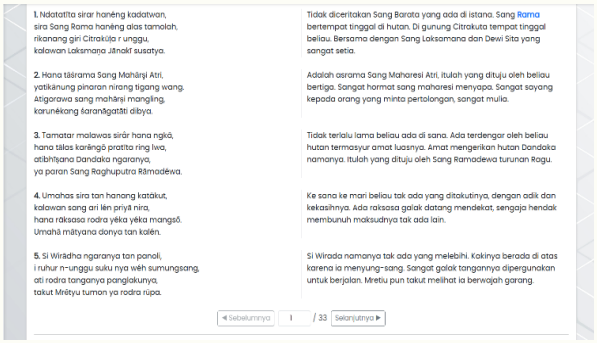

Figure 6. Ramayana Story Content Interface

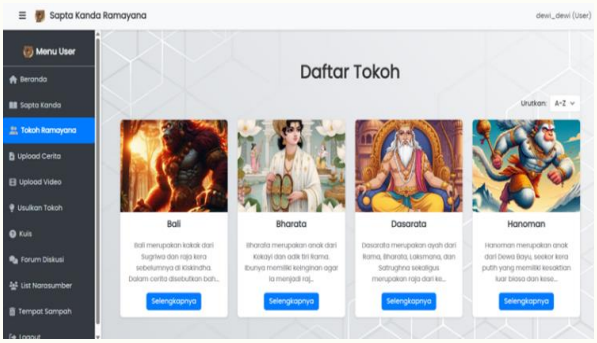

Figure 7. Ramayana Character Menu Interface

Figure 6 shows the interface that displays the contents of the selected Kanda Ramayana. This page is a story detail page that presents Ramayana story information in two languages, namely Old Javanese as the original language of the story and Indonesian as its translation. Figure 7 shows the Ramayana characters feature in the Sapta Kanda Ramayana Information System. This menu is used by users to access information about the characters involved in the Ramayana story. This page displays the characters, and users can select the desired character to see the details of the selected character.

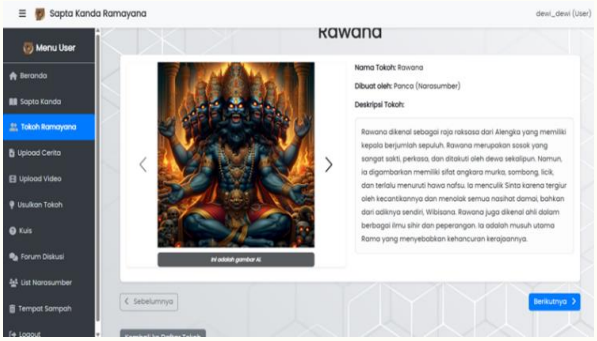

Figure 8. Ramayana Character Detail Page Interface

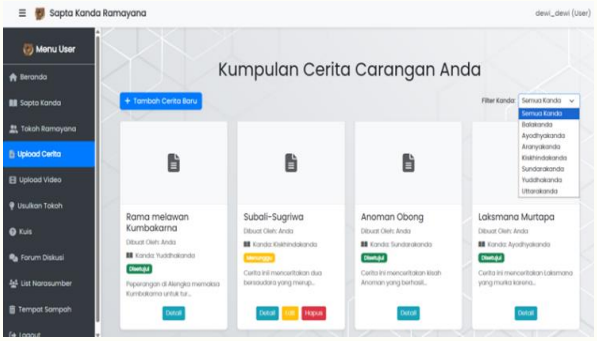

Figure 9. Side Story Management Menu Interface

Figure 8 shows the interface of the Ramayana character detail page. This page displays information and images of the selected character. Users can switch to other characters by pressing the previous or next button. The developed system also provides several interactive features for users. Figure 9 shows the interface of the side story management page for users. Users can upload side story content related to the main story of Ramayana. Users can group side story content based on which part of Kanda it belongs to.

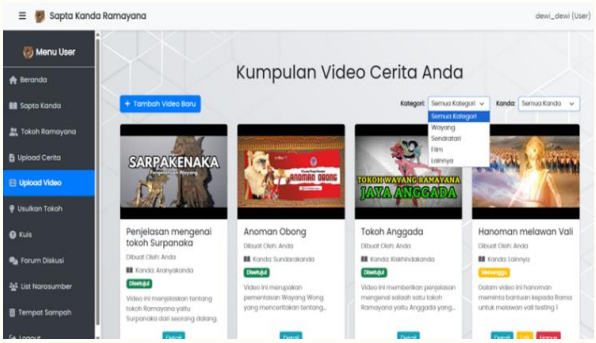

Figure 10. Story Video Menu Interface

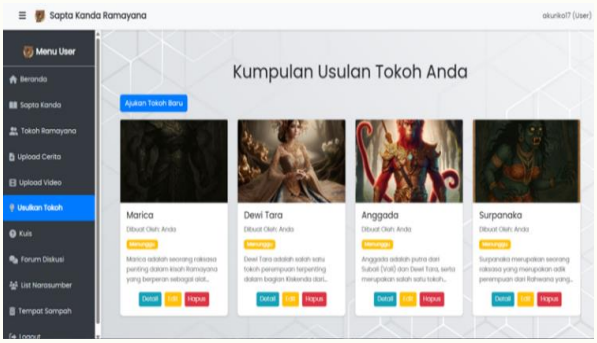

Figure 11. Suggested Character Menu Interface

Figure 10 shows the video story management page interface for users. Users can upload video story content about the Ramayana story. Users can group video story content into related Kanda and into several categories such as puppetry, dance drama, films, and other categories for video story content outside the three main categories. Figure 11 shows the interface of the character suggestion management page for users. Users can submit character suggestions related to the Ramayana by sharing images and information about the suggested characters. All content uploaded by users, such as side stories, story videos, and character suggestions, must go through a validation process carried out by resource persons and admins.

Resource Pesons and Admin Interface

The interface for resource persons and admins is a page used by resource persons and admins to access and manage content presented on the Sapta Kanda Ramayana Information System. The page display for resource persons and admins to support the content management process on the Sapta Kanda Ramayana Information System includes the Sapta Kanda management page, the Ramayana Characters management page, and the content contribution validation page.

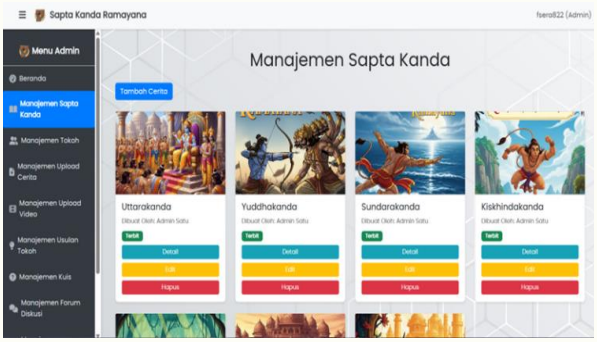

Figure 12. Sapta Kanda Management Interface

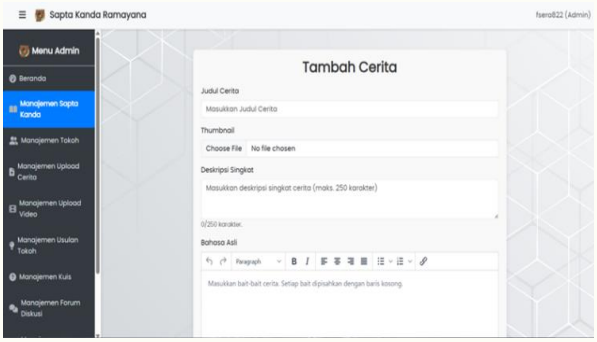

Figure 13. Add Sapta Kanda Content Interface

Figure 12 shows the Sapta Kanda management page interface used by resource persons and admins to manage the main content of the system, namely the Sapta Kanda Ramayana stories. This page is used to view the number of stories added and can be used to view details of the stories added or delete stories that have been added. Figure 13 shows the Sapta Kanda story entry page interface. This page is used by resource persons and admins to fill in information about the Sapta Kanda Ramayana stories. Filling in information about Sapta Kanda stories is done by filling in several required data fields, such as the story title, the story content in two languages, namely Old Javanese as the original language

and Indonesian as the translation, and other data to complete the Sapta Kanda story information, which will then be published and displayed on the user page.

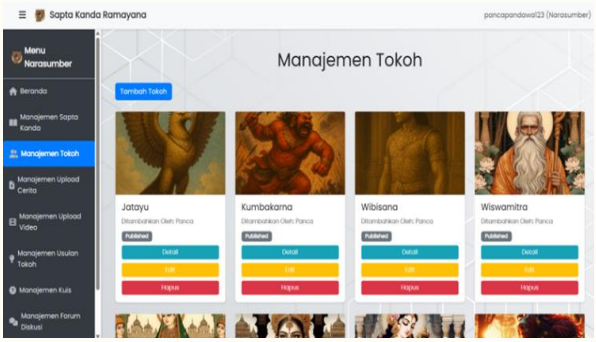

Figure 14. Ramayana Character Management Interface

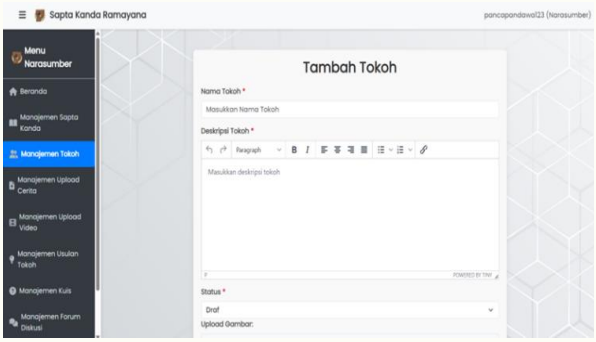

Figure 15. Add Ramayana Character Interface

Figure 14 shows the character management interface used by resource persons and admins. This page is used to view the number of Ramayana characters added. This page can also be used to view character details or delete added characters. Figure 15 shows the character addition interface used by resource persons and admins to fill in character information. Resource persons and admins can add images and information about characters that will be displayed on the user side.

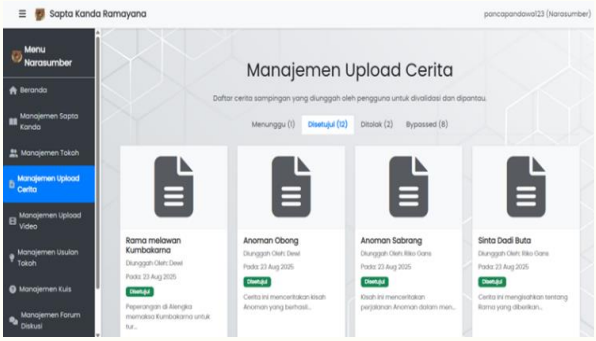

Figure 16. Side Story Content Validation Interface

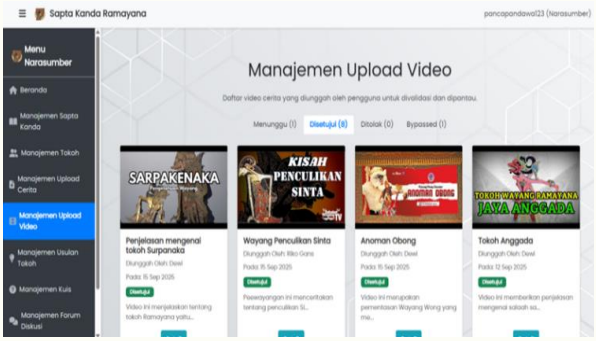

Figure 17. Video Story Content Validation Interface

Figure 16 shows the side story content management page interface. This page is used by resource persons and admins to validate side story content uploaded by users. The validation process is carried out by approving or rejecting side story content uploaded by users. Figure 17 shows the interface of the story video content management page. This page is used by resource persons and admins to validate story video content uploaded by users. The validation process is carried out by approving or rejecting story video content uploaded by users.

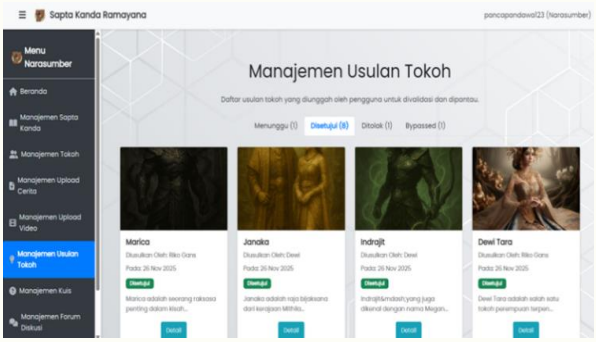

Figure 18. Character Suggestion Content Validation Interface

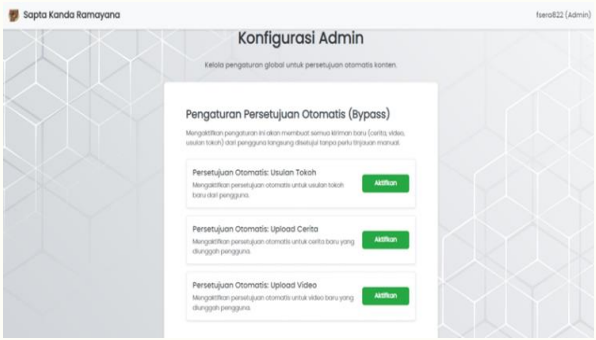

Figure 19. Bypass Settings Interface

Figure 18 shows the interface of the Ramayana character suggestion content management page. This page is used by resource persons and admins to validate character suggestion content uploaded by users. The validation process is carried out by approving or rejecting character suggestion content uploaded by users. The developed system also has a feature to simplify the content validation process by providing a bypass setting configured by admins. The bypass setting functions to automatically validate content uploaded by users without going through a manual approval process. If the bypass setting is turned on, content uploaded by users, such as side stories, story videos, and character suggestions, will be automatically approved by the system. If the bypass setting is turned off, content uploaded by users will have a pending status and must go through a manual approval process.

Blackbox Testing

System evaluation using the blackbox method aims to test the features of the developed information system with various designed scenarios. Table 1 shows the results of blackbox testing, which includes test cases containing the tested features, expected results, and conclusions.

Table 1. Blackbox Testing Results

No.	Test Case	Expected Results	Conclusion
1.	Log in	Admins, resource persons, and users can log in with valid data.	Succeed
2.	Viewing the Sapta Kanda page	Users can view the Sapta Kanda story collection page	Succeed
3.	Viewing the Sapta Kanda details page	Users can view the Sapta Kanda story details page.	Succeed
4.	Viewing the Ramayana characters page	Users can view the Ramayana character collection page.	Succeed
5.	Viewing the Ramayana characters' details page	Users can view the Ramayana character details page.	Succeed
6.	Adding side stories	Users can add side stories to the system.	Succeed
7.	Adding Ramayana story videos	Users can add Ramayana story videos to the system.	Succeed
8.	Adding character suggestions	Users can add character suggestions to the system.	Succeed
9.	Adding Sapta Kanda stories	Admins and resource persons can add Sapta Kanda stories to the system.	Succeed
10.	Adding Ramayana characters	Admins and resource persons can add Ramayana characters to the system.	Succeed
11.	Validating content uploaded by users	Admins and resource persons can validate user content.	Succeed
12.	Configuring content bypass	Admins can configure content bypass on the system.	Succeed

Table 1 shows the results of black box testing conducted on the system. Testing was carried out by testing features on the system using pre-designed scenarios. The testing was carried out using test cases that described the testing scenarios and features being tested, expected results containing the expected testing results, and conclusions containing the conclusions of the testing. Through black box testing, it can be stated that the features in the system have been running in accordance with the research requirements.

System Usability Scale (SUS) Testing

Usability testing was conducted using the SUS method to determine user ease of use and satisfaction. Testing with the SUS method involved a number of users who had used the Sapta Kanda

Ramayana Information System. Table 2 shows the questions and rating scales posed to system users during the SUS testing.

Table 2. System Usability Scae (SUS) Questions

No.	Questions	Score
1.	I intend to use the Sapta Kanda Ramayana Information System again in the future.	1-5
2.	I am having difficulty using the Sapta Kanda Ramayana Information System.	1-5
3.	I find the Sapta Kanda Ramayana Information System is easy to use.	1-5
4.	I need guidance from others to be able to use the Sapta Kanda Ramayana Information System.	1-5
5.	I found that all features available on the Sapta Kanda Ramayana Information System are working well.	1-5
6.	I found many inaccuracies in the Sapta Kanda Ramayana Information System.	1-5
7.	I feel that others will quickly understand how to use the Sapta Kanda Ramayana Information System.	1-5
8.	I find the Sapta Kanda Ramayana Information System confusing to use.	1-5
9.	I feel comfortable using the Sapta Kanda Ramayana Information System.	1-5
10.	I need time to get used to the Sapta Kanda Ramayana Information System before using it.	1-5

Table 2 contains questions asked to system users to measure their satisfaction level. These questions were asked to system users by distributing a form. A total of ten questions were asked, and each question had a rating scale from one to five.

Table 3. System Usability Scale (SUS) Results

Respondents	Score
R1	67.5
R2	60
R3	97.5
R4	97.5
R5	82.5
R6	90
R7	65
R8	90
R9	87.5
R10	97.5
R11	95
R12	100
R13	100
R14	97.5
R15	67.5
R16	82.5
R17	82.5
R18	70
R19	85
R20	90
R21	90
Total Score	**1795**
Average Score	**85.4**

The SUS test results were processed using a calculation method to find the final score for each respondent. The SUS scores of each respondent were then added up and averaged to obtain the final

SUS score. Table 3 shows the SUS scores obtained from 21 respondents, with a final average score of 85.4. The average SUS score of 85.4 places the developed system in the "Excellent" category according to the adjective rating scale proposed by Bangor et al. (2009), which is a meaningful result given that the target users ranged from general public users to domain experts. This high level of acceptance can be attributed to several design decisions: the intuitive navigation structure that allows users to browse Kanda stories without prior knowledge of the Ramayana, the bilingual presentation that makes the content accessible to both scholars familiar with Old Javanese and younger audiences who read only Indonesian, and the clear role separation that prevents users from encountering administrative complexity. In the context of cultural preservation, a score above 80 indicates that users are not only willing to use the platform but are also likely to recommend it to others, which is a critical factor for sustaining long-term community engagement with the Ramayana heritage.

Compared to prior studies in the domain of cultural information systems, the findings of this study are consistent with and extend existing work. Ramadhani and Setiawan (2024), who developed a web-based platform for local cultural heritage promotion, reported improved user accessibility but did not implement a structured content validation workflow. The present system advances this by introducing a three-tier role model (user, resource person, admin) with a configurable bypass mechanism, which represents a more robust approach to managing crowdsourced cultural content. Similarly, Apriliyani et al. (2022) applied Agile methodology to cultural web app development and highlighted user engagement as a key success metric; the SUS score of 85.4 obtained in this study compares favorably and validates the usability of the Waterfall-based development approach for projects with well-defined requirements. However, unlike those studies, the present work does not yet include an analysis of long-term user retention, frequency of content contributions, or the educational impact on users' understanding of the Ramayana—dimensions that should be explored in future research to more comprehensively assess the platform's effectiveness as a cultural preservation tool.

CONCLUSIONS

The Sapta Kanda Ramayana Information System was created using the Laravel Framework and developed using the Waterfall Method, producing a system with features that suit research needs and serve as an educational platform and a means of conveying information about the Ramayana story. The system developed is able to present the story of Sapta Kanda Ramayana in a more attractive and structured display. The system design produced various features such as Sapta Kanda story management, Ramayana character management, user content management, such as side stories, story videos, and character suggestions, as well as content validation management.

The system evaluation process, tested using the black box testing method, concluded that the features in the system were in accordance with the research needs and objectives, thus indicating that the features available in the system were fully functional. The developed system was also tested using the SUS method to obtain user satisfaction levels. The test results using the SUS method showed that the system obtained an average score of 85.4, which refers to the SUS assessment scale that the system is in the excellent category in adjective ratings, ranked B in the grade scale, and is acceptable in the acceptability range scale. This shows that the Sapta Kanda Ramayana Information System shows a good level of use and is acceptable to users.

Thus, the Web-Based Sapta Kanda Ramayana Information System can be one of the platforms that can provide education and can be a reference for the use of technology as an effort to preserve culture, so that it looks more attractive and accessible to the general public. Although the developed system has shown optimal results, it can still be further developed. As a recommendation for future research, the Sapta Kanda Ramayana Information System can be developed into a mobile application version with a more attractive and interactive interface by adding certain special assets. The application of AI, such as chatbots or AI that can generate images, can be added to the system to support the user experience in obtaining information about the Ramayana story.

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