Enhancing E-Commerce for Book Sales:
Development and Evaluation of the B-Store Mobile Application

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Abstract

The mobile-based online book store application B-Store was developed to enhance the effectiveness and efficiency of book promotion and sales through an e-commerce platform. This research aims to develop effective promotional strategies, identify consumer obstacles in searching and purchasing books online, and design application features that meet consumer needs. By using hardware and software requirements analysis, software design, flowchart diagrams, use case diagrams, and data flow diagrams, the B-Store application successfully meets user needs in purchasing books online. Code implementation was done in Java using Android Studio, and testing was conducted using a Likert scale questionnaire, indicating user satisfaction with the application. The conclusion of this study is that the B-Store application successfully improved services for book sellers and provided a more convenient shopping experience for consumers through an intuitive online book sales platform.

Keywords: Mobile application, e-commerce, online book store, promotional strategies, user satisfaction.

Abstract

Aplikasi toko buku online B-Store berbasis mobile dikembangkan untuk meningkatkan efektivitas dan efisiensi promosi serta penjualan buku melalui platform e-commerce. Penelitian ini bertujuan untuk mengembangkan strategi promosi yang efektif, mengidentifikasi kendala konsumen dalam mencari dan membeli buku online, serta merancang fitur-fitur aplikasi yang memenuhi kebutuhan konsumen. Dengan menggunakan metode analisis kebutuhan perangkat keras dan lunak, desain perangkat lunak, flowchart diagram, use case diagram, dan data flow diagram, aplikasi B-Store berhasil memenuhi kebutuhan pengguna dalam membeli buku secara online. Implementasi kode dilakukan dalam Java menggunakan Android Studio, dan pengujian dilakukan dengan kuesioner skala Likert yang menunjukkan kepuasan pengguna terhadap aplikasi. Dengan demikian, kesimpulan dari penelitian ini adalah bahwa aplikasi B-Store berhasil meningkatkan layanan bagi penjual buku dan memberikan pengalaman berbelanja yang lebih nyaman bagi konsumen melalui platform penjualan buku online yang intuitif.

Kata Kunci: Aplikasi mobile, e-commerce, toko buku online, strategi promosi, kepuasan pengguna.
1. Introduction

The increasing development of existing technology and people's creativity, especially in the field of online business, such as the emergence of bookstores that use the internet as a promotional medium, are often even used as a marketing/sales medium or what is known as e-commerce[1]. E-commerce is a direct impact of the emergence of the internet, as well as a major internal effect on the business world since it was first used, until now the internet has been used for various purposes in its development [2].

Currently, the product sales system via the internet is developing rapidly. Many companies utilize mobile-based technology as a company strategy to offer their products to all consumers without having to be limited by time and space. Starting from large companies to small and medium businesses, online sales systems have become a cheap and affordable promotional tool. The products offered by each online sales site are very diverse. One product that is very possible and very easy to sell online is books [3].

Various problems occur when someone wants to shop for books, starting from not knowing what book they want because there is no form of electronic catalogue, limited information about the book they are looking for and bookstores that are not certain to have the book they want, which results in prospective buyers having to visit the store. Book to find out information about the book you are looking for. This is course really wastes time, money and energy just to look for information on a book [4].

Conventional bookstores also experience very tight competition, so they need a marketing strategy for their products with good alternatives, which can attract and reach more consumers and can provide satisfaction to consumer wants and needs. The marketing strategy implemented by a bookstore is currently considered less effective and efficient, because both marketing and product ordering are only done manually with a high risk of errors. So, to make it easier to order or purchase, a mobile application was created where you can buy books online at affordable prices. Based on the things mentioned above, the design of a mobile-based book sales application, where the name of the mobile application created was "B-STORE" [3].

2. Method

2.1. Preliminary Research

The trend of using mobile devices in purchasing books has increased significantly, reflecting the evolution of consumer behavior which prioritizes ease and speed of transactions [5]. In developing a book selling application that is responsive to mobile devices, there are advantages and challenges that must be considered. The main advantage is the ability to reach more customers through widely used mobile devices. Responsiveness to mobile devices also improves the user experience by making access and navigation easier. Customers can easily check book stock availability, place orders online, and get books at competitive prices. Every human being always wants convenience, speed and relevant information systems to facilitate all their activities [4]. However, challenges include expanding features to meet diverse user needs, as well as ensuring the security of user data in a mobile environment that is vulnerable to cyber attacks. Compatibility with various models and screen sizes of mobile devices also needs to be considered. The increasing number of users who carry out transactions online has a direct impact, namely the buyer's sense of trust in the security of the transaction [6].

In the context of developing a mobile-based book selling application, there are several security techniques that can be applied to protect user information. First, the use of data encryption to protect sensitive information such as payment details and user personal information when stored or transmitted via network. Additionally, implementing two-factor authentication can increase the level of security by requiring additional verification beyond just the password. Regular security audits are also important to identify and fix potential vulnerabilities in applications. The use of security technologies such as firewalls and malware scanning is also necessary to prevent unauthorized access and cyber attacks. Android has a user-friendly appearance for all groups [7].

2.2. Requirement Analysis

In the system development process, we analyze two main aspects: hardware and software.

- Hardware (Hardware)
  - We assess hardware requirements by identifying the required devices, such as a laptop with a minimum of 3 GB RAM and an Intel Core i5 processor, a smartphone with the Android operating system, and a USB cable. These hardware components are essential to ensure the system functions smoothly.

- Software (Software)
  - We analyze software requirements by determining the tools and platforms required for development. This includes using Android Studio as a development environment, Java as a programming
language, Firebase as a database for efficient data management, Google Chrome as a web browser for testing, and Figma for design needs. Figma is generally used by someone who works in UI/UX, web design and other similar fields [8].

2.3. Software Design

In any software development, it is critical to go through the design phase thoroughly to ensure the system meets the desired goals. This design phase involves requirements analysis, use case identification, and creation of a data flow diagram (DFD). By carefully planning the structure and functionality of the software, we can lay a strong foundation for a successful development process. Let’s explore the software design process with a special focus on use case analysis and DFD creation[9].

a. Flowchart Diagram

For the initial design of creating a mobile-based online book selling application, what is needed is to build a flowchart diagram because this section will describe the running of the application in an abstract way, here is the flowchart diagram:

![Diagram](https://via.placeholder.com/150)

Figure 1. Application flowchart

In the flow diagram above, it is depicted how the application will operate. Starting from the home page, users can choose to log in as a user or administrator. If logged in as an administrator, the user is asked to enter a predetermined username and password. Meanwhile, if you log in as a user, the user is directed to the login page. If the user already has an account, they can log in; if not, they will be directed to register first. After logging in as administrator, the user will see a page listing the checkouts that have been carried out by the user. Next, users can see a list of criticisms and suggestions that have been given by users. When users log in, they will be directed to the main user menu, where they can choose from a wide variety of books. After selecting a book, users will be taken to that book’s page, where they can choose to checkout the book or add it to their cart. The order will be completed and ready to ship after that.

b. Use Case Diagrams

A use case provides a detailed description of how actors (users, external systems, or entities) interact with the software system being developed. It captures various scenarios and actions that actors can perform in the system. In the context of the B-Store application, a use case diagram is created to represent these interactions visually.

![Diagram](https://via.placeholder.com/150)

Figure 2. Use case application diagram

In the use case presentation for this application, there are two use cases, namely admin and user. Firstly, admin, admin can access several frames, namely login, admin main menu, checkout list, as well as criticism and suggestions. The checkout list and criticism and suggestion frames will receive and display input received from the user. Next, the user, the user here will access several frames like the admin, the frames for the user are login/registration, the user’s main menu, choosing a book (book checkout input) and the criticism & suggestions menu. The frame of choosing a book and criticizing it will carry out input activities and this input will be sent to the frame in the admin.

c. Data Flow Diagram (DFD)

In developing this application, DFD helps in modeling the processes that occur in the system, the entities involved. This depicts how data flows in the system, including input and output.
The image above is a DFD (Data Flow Diagram) which describes the flow of data in a book sales application. First of all, if the user is an admin, they will be prompted to log in. After logging in, admin can

![Data Flow Diagram](image)

Figure 3. Application data flow diagram

d. Entity Relation Database (ERD)

ERD is the main data modeling that helps organize data in a project into entities and determine relationships between entities. The image below is a representation of the relationship between entities where the Registration entity has a 1 to 1 relationship with the Checkout and Response entities via username.

![Entity Relationship Diagram](image)

Figure 4. Entity relationship diagram application

2.4. Code Implementation

In this research, the coding stage involves writing program code in Java to convert the designed system into commands that can be understood by the computer. Android Studio is used as the software to write the code. At this stage, design specifications are converted into instructions that a computer can understand and execute, enabling the development of desired functionality and features in the application.

2.5. Testing

In the testing stage, we used a questionnaire with a Likert scale consisting of 5 levels to collect user input. This allows us to quantitatively measure user opinions and perceptions regarding various aspects of the application, such as usability, functionality and overall satisfaction.

Based on the feedback collected, we analyze the responses and produce test results that provide insight into areas where the application performs well and areas that need improvement.

By using a questionnaire with a Likert scale, we ensure that user feedback remains an integral part of the development process. This iterative approach allows us to continually refine and improve the app based on user feedback, resulting in a better user experience and a more robust product with each iteration.

3. Results and Discussion

3.1. Code Implementation

The outcome of developing the B-Store application is an online book sales platform that users can use to explore and buy various books digitally. The Android platform-based B-Store user interface can be described as follows:

a. Login Page

On the login page, users are asked to enter their username and password to log in. Additionally, there is a “forgot password?” if the user forgets the password. The login page can be seen on Figure 5.
On the registration page, users are required to enter their email, username and password to be able to enter the B-STORE application. The registration page can be seen as follows.

b. Home page
This page contains information about books for sale as well as a menu to see what book categories are in the B-STORE application. The view of home page is shown in Figure 6.

c. Favorite page
On this page, users can save books they like or want to buy in the future. Users can add books to their favorites list with one click and access this list at any time to view their saved books. Interface of favorite page is shown in Figure 7.
d. Cart Page

On this page, users can add the books they want to purchase before making payment. In My Cart, users can view all the books they selected, change the number of books, delete books, or add new books. This feature also displays the total price of all the books in the cart and allows users to proceed to the checkout and payment process. Implementation of Cart Page can be seen in Figure 8.

![Figure 8. Application cart page](image)

After that, users can proceed to confirm and complete the payment.

![Figure 9. Book details page](image)

3.2. User Testing

System testing was carried out using the Likert scale method. The Likert scale presents items expressed in several alternative responses (SS=Strongly Agree, S=Agree, N=Neutral, TS=Disagree, STS=Strongly Disagree) [9]. This test is carried out to measure the user's assessment of all attributes. The number of user inputs can be seen in Table 1.

The results given in Table 1 can be summarized as follows,

<table>
<thead>
<tr>
<th>Response</th>
<th>Number of Inputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Disagree</td>
<td>0 Statements</td>
</tr>
<tr>
<td>Disagree</td>
<td>1 Question</td>
</tr>
<tr>
<td>Neutral</td>
<td>64 Statements</td>
</tr>
<tr>
<td>Agree</td>
<td>258 Statements</td>
</tr>
<tr>
<td>Strongly Agree</td>
<td>177 Statements</td>
</tr>
</tbody>
</table>

Due to the Number of Respondents, the percentage is shown below,

<table>
<thead>
<tr>
<th>Response</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Agree</td>
<td>53.2%</td>
</tr>
<tr>
<td>Agree</td>
<td>77.1%</td>
</tr>
<tr>
<td>Neutral</td>
<td>19.2%</td>
</tr>
<tr>
<td>Disagree</td>
<td>0.3%</td>
</tr>
<tr>
<td>Strongly Disagree</td>
<td>0%</td>
</tr>
</tbody>
</table>
4. Conclusions and recommendations

The mobile-based B-Store online bookstore application was developed to increase the effectiveness and efficiency of promotions and book sales through e-commerce platforms. This research aims to develop an effective promotional strategy, identify consumer obstacles in searching for and buying books online, and design application features that meet consumer needs. By using hardware and software requirements analysis methods, software design, flowchart diagrams, case diagrams, and data flow diagrams, the B-Store application has succeeded in meeting user needs in buying books online. Code implementation was carried out in Java using Android Studio, and testing was carried out using a Likert scale questionnaire indicating user satisfaction with the application. Thus, the conclusion of this research is that the B-Store application has succeeded in improving services for booksellers and providing a more comfortable shopping experience for consumers through an intuitive online book selling platform.

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