

**Tribhuvan University**

**Faculty of Humanities and Social Science**

**Project Proposal on**

**EcoTrade**

**(Buy, Exchange and Giveaway Platform)**

**Submitted to**

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***Application***

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**Table of Contents**

[List of Figures 2](#_Toc200231659)

[List of Table 3](#_Toc200231660)

[List of Abbreviations Used 4](#_Toc200231661)

[Chapter 1: Introduction 5](#_Toc200231662)

[1.1 Introduction 5](#_Toc200231663)

[1.2 Problem Statement 5](#_Toc200231664)

[1.3 Objectives 6](#_Toc200231665)

[1.4 Scope 6](#_Toc200231666)

[1.5 Limitations 6](#_Toc200231667)

[Chapter 2: Background Study and Literature Review 8](#_Toc200231668)

[2.1 Background Study 8](#_Toc200231669)

[2.2 Literature Review 9](#_Toc200231670)

[Chapter 3: Methodology 10](#_Toc200231671)

[3.1 Overview 10](#_Toc200231672)

[3.2 Methodology 10](#_Toc200231673)

[3.3 System Analysis 10](#_Toc200231674)

[3.4 Flow Chart 11](#_Toc200231675)

[3.5 Algorithm Used 12](#_Toc200231676)

[3.6 Gantt Chart 13](#_Toc200231677)

[Chapter 4: Conclusion 15](#_Toc200231678)

[4.1 Conclusion 15](#_Toc200231679)

[4.2 Expected Outcomes 15](#_Toc200231680)

[References](#_Toc200231681)

# List of Figures

[Figure 3.1: Agile Methodology 10](#_Toc200231173)

[Figure 3.2: Flow Chart of EcoTrade 12](#_Toc200231174)

# List of Table

[Table 3.1: Project Schedule 13](#_Toc200231042)

# List of Abbreviations Used

CSS : Cascading Style Sheet

HTML : Hypertext Markup Language

JS : JavaScript

MERN : Mongodb Express js React js Node js

# Chapter 1: Introduction

## 1.1 Introduction

**EcoTrade** is a web-based platform designed to enable users to buy, exchange, or give away books within their selected geographical area. Focused on promoting sustainability and community engagement, the platform encourages the reuse of books, reducing waste and offering value for money through cost-effective access to reading materials.

The system features a single-login interface that allows users to seamlessly manage all trading activities. With location-based filtering, users can view relevant listings within their area, simplifying local transactions and fostering community connections. Built using the MERN stack (MongoDB, Express.js, React.js, Node.js), EcoTrade is scalable, responsive, and ready for future expansions such as payment integration, recommendation algorithms, and mobile support.

In essence, EcoTrade is more than just a marketplace it is a community-driven solution that promotes affordability, accessibility, and environmental responsibility in book sharing.

## 1.2 Problem Statement

Access to educational and leisure books remains a challenge for many individuals due to high prices, limited availability, and lack of organized platforms for second-hand or free book sharing. Simultaneously, many books are left unused in households and institutions, contributing to waste and missed opportunities for reuse.

**Identified Problems:**

* New books are often expensive, making them unaffordable for students and low-income readers.
* Countless usable books are sitting idle in homes and libraries with no efficient way to redistribute them.
* Existing platforms are primarily profit-driven and do not focus on local book sharing or community engagement.
* Current solutions rarely support direct exchange or giveaways, which could make access easier and more inclusive.
* Users cannot easily find books near their geographical area, leading to higher delivery costs and logistical challenges.
* Most platforms do not consider or highlight the environmental benefits of reusing books.

## 1.3 Objectives

The increasing demand for affordable educational and leisure resources, coupled with growing environmental concerns, has highlighted the need for platforms that support sustainable sharing practices. Books, in particular, are often underutilized purchased once and left unused, despite retaining value. Traditional online marketplaces focus on sales and lack features for community-oriented book exchange or giveaways. EcoTrade addresses this gap by aiming to create a user-friendly, location-aware platform where individuals can buy, exchange, or give away books easily. The following objectives have been formulated to guide the development of this platform, ensuring it aligns with both user needs and sustainable practices.

* To develop a web-based platform that allows users to buy, exchange, or give away books within their local area, promoting affordable and accessible reading.
* To implement a single-login system enabling users to manage all functionalities: posting, browsing, and messaging—through one account for a seamless experience.
* To allow users to create and post listings for books they want to sell, exchange, or give away, ensuring active participation in the platform.
* To promote value for money and sustainability by encouraging the reuse of books and optionally tracking users' environmental contributions

## 1.4 Scope

EcoTrade is designed to create a focused and community-driven platform that encourages the reuse and sharing of books. By concentrating on a single product category and supporting location-based interactions, the platform aims to provide a manageable, user-friendly environment that promotes sustainability and value for money.

* The platform facilitates buying, exchanging, and giving away books specifically within user-selected geographic areas.
* A unified login system allows users to manage all their activities smoothly.
* Listings are automatically moderated to maintain community trust and content quality.
* Developed as a responsive web application using the MERN stack to ensure scalability and accessibility.

## 1.5 Limitations

EcoTrade is designed to provide a streamlined and community-focused platform for book trading, there are inherent limitations that impact its initial functionality and user experience. The project’s current scope excludes certain features like payment integration and a mobile app, which may affect convenience for some users. Additionally, reliance on automated moderation and user engagement introduces challenges in maintaining content quality and activity levels. Recognizing these limitations is essential for setting realistic expectations and planning future enhancements.

* The platform supports only books, excluding other product categories.
* No payment gateway integration is available, requiring users to handle transactions offline.
* Automated moderation may not catch all inappropriate content immediately.
* The success of the platform depends heavily on active user participation.

# Chapter 2: Background Study and Literature Review

## 2.1 Background Study

The increasing cost of books and limited access to affordable reading materials have become significant barriers for many readers worldwide, especially in developing regions. Books often remain underutilized after purchase, contributing to waste and missed opportunities for knowledge sharing. As digital transformation accelerates, online platforms that enable the reuse and sharing of physical books have gained importance in fostering sustainable consumption and community engagement. EcoTrade aims to address these issues by facilitating the localized exchange, sale, and giveaway of books through a user-friendly web application.In recent years, the concept of the sharing economy has expanded beyond traditional sectors such as transportation and accommodation to include goods like books [1]. This movement encourages users to share, lend, or exchange items to maximize resource utilization and reduce environmental impact . However, many existing platforms focus mainly on sales or donations without integrating comprehensive exchange features or geographical relevance, which can limit community involvement and the overall efficiency of book reuse. [2]

EcoTrade’s focus on location-based interactions aligns with research indicating that proximity plays a critical role in peer-to-peer exchanges . Localized marketplaces reduce transportation costs and carbon footprints while encouraging stronger community ties. By restricting the scope to books, the platform simplifies the user experience and leverages niche expertise, allowing for better matching of supply and demand and more effective moderation.

Sustainability considerations are central to EcoTrade’s design. Beyond simply facilitating transactions, the platform incorporates environmental impact awareness by estimating the positive effects of book reuse, such as carbon emission reductions . This feature serves to motivate users by making the benefits of their actions tangible, supporting wider goals of environmental responsibility and resource conservation. [3]

Technologically, EcoTrade leverages the MERN stack (MongoDB, Express.js, React.js, Node.js), a modern and flexible development environment suitable for building scalable and maintainable web applications. The choice of this stack ensures that the platform can efficiently handle real-time updates, user interactions, and data management, essential for providing a smooth and responsive user experience. [4]

## 2.2 Literature Review

Online marketplaces and peer-to-peer platforms have been widely studied as mechanisms for resource sharing and community engagement. Platforms like eBay and OLX pioneered the buying and selling of second-hand goods, but their broad focus often results in less tailored experiences for specific user needs such as book trading. Research suggests that specialized platforms can offer superior user satisfaction by addressing domain-specific challenges and fostering stronger communities [5].

Studies on sharing economy applications highlight the importance of trust and safety in encouraging participation. Automated moderation systems and user rating mechanisms have been identified as key factors that help maintain platform integrity . EcoTrade’s approach to automated content moderation aligns with these findings, aiming to minimize manual intervention while preserving quality and user trust. [2]

Location-based services (LBS) have been increasingly integrated into sharing platforms to improve relevance and user convenience. Literature shows that proximity not only reduces logistical challenges but also enhances social connections among users, fostering community cohesion . By incorporating location filtering, EcoTrade follows best practices that have been shown to increase platform engagement and transaction success rates. [6]

Environmental sustainability is a growing area of interest in the literature on digital marketplaces. Several studies demonstrate that platforms enabling the reuse of goods contribute significantly to waste reduction and resource efficiency . However, few platforms actively communicate this impact to users.

EcoTrade’s environmental impact calculator is inspired by research advocating for real-time feedback as a motivator for sustainable behavior change. Finally, technology stack choices play a critical role in platform performance and scalability. The MERN stack is recognized for its full-stack JavaScript environment, allowing for efficient development and real-time data handling and case studies on MERN-based applications show advantages in flexibility and community support, making it a fitting choice for EcoTrade’s evolving needs [7].

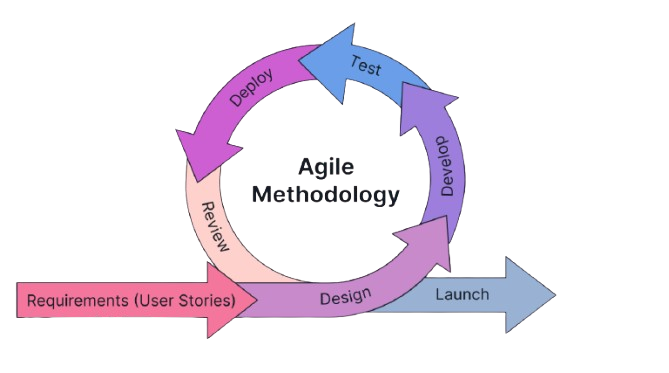
# Chapter 3: Methodology

## 3.1 Overview

EcoTrade is developed as a responsive web application using the MERN stack (MongoDB, Express.js, React.js, and Node.js), following the Agile development approach. The system supports a user-centric design with features including book listings, location-based filtering, and environmental impact tracking. Through continuous iteration and sprint-based cycles, the application evolves in response to stakeholder feedback. Backend APIs manage data operations, and the frontend ensures seamless interactions, while automated moderation and messaging enhance trust and usability.

## 3.2 Methodology

The EcoTrade project employs the Agile methodology, which is well-suited for dynamic and evolving environments. Agile promotes flexibility, iterative development, early and continuous delivery, and active user engagement. In the context of EcoTrade, where feedback loops and requirement adaptations are essential, Agile offers a systematic yet adaptable approach.



**Figure 3.1: Agile Methodology**

## 3.3 System Analysis

System analysis focuses on thoroughly understanding the current problems and determining how EcoTrade can address them effectively. This includes requirement identification, feasibility study, and high-level system modeling.

**3.3.1 Requirement Analysis**

Requirement analysis involves collecting detailed information on what the system should do from users, developers, and other stakeholders

**Functional Requirements**

Functional Requirements define the core functionalities the system must support. Some key functional requirements of the project are as below:

* User Registration/Login (Single Sign-On)
* Create and Post Book Listings
* Filter Books by Category and Location
* Book Trading Options (Buy/Exchange/Giveaway)
* In-app Messaging

**Non Functional Requirements**

Non-Functional Requirements define how the system should perform:

* application should offer a responsive interface that adjusts layout across screen sizes for improved web usability.
* provide low-latency responses for smooth user experience during interactions.
* Automated keyword-based moderation should flag inappropriate content without human input during posting.
* must provide low-latency responses for smooth user experience during interactions.

**3.3.2 Feasibility Analysis**

Feasibility analysis evaluates whether the project is viable in terms of technology, operation, and economy.

**Technical Feasibility**

EcoTrade leverages the MERN stack (MongoDB, Express.js, React, Node.js), which provides a modern, scalable, and efficient development framework. Cloud services and containerization also enhance deployment and maintainability.

**Operational Feasibility**

The system aims to deliver user-friendly interfaces, intuitive flows, and automated features, making operations seamless. Admin tools further ensure smooth backend management.

**Economic Feasibility**

Open-source technologies reduce initial costs. The sustainable model of book reuse ensures long-term benefits with minimal recurring expenses.

## 3.4 Flow Chart

The system flowchart provides a visual representation of the core application flow. It outlines how users interact with the system from logging in to completing a book trade. This ensures clarity in navigation and helps developers and stakeholders understand how the system processes data and user actions at each step.



**Figure 3.2: Flow Chart of EcoTrade**

## 3.5 Algorithm Used

To deliver personalized recommendations, EcoTrade can implement filtering algorithm whose detailed explanation is as below:

**Activity-Based Filtering**

**Concept**:  
Recommends books based on aggregate implicit interactions (views, clicks, requests) across all users. Prioritizes items with high engagement, weighted by action importance.

**Mechanics**:

1. **Track Activities**: Log user actions:
   * **Views**: User sees a book listing.
   * **Clicks**: User clicks for details.
   * **Requests**: User initiates a swap/purchase.
2. **Calculate Relevance Scores**: Assign weights to actions (e.g., request > click > view).
3. **Compute for each book:**

Score=(wv×views)+(wc×clicks)+(wr×requests)

* + wv,wc,wr Predefined weights (e.g., 0.1,0.3,0.6).
  + Weights reflect action intent (e.g., a request signals stronger interest than a view).

1. **Recommend Top-Scoring Books**: Rank books by their scores and suggest the highest to users.

**Example**:

* **Books**: *Book A*, *Book B*.
* **Activity Counts**:
  + *Book A*: 100 views, 60 clicks, 20 requests.
  + *Book B*: 200 views, 40 clicks, 10 requests.
* **Weights**: wv=0.1*,* wc=0.3, wr=0.6.

**Calculate Scores**:

**Book A**: (0.1×100)+(0.3×60)+(0.6×20) = 10+18+12 = 40

**Book B**: (0.1×200)+(0.3×40)+(0.6×10) = 20+12+6 = 38

**Result**: *Book A* (score 40) > *Book B* (score 38). Recommend *Book A* more prominently.

## 3.6 Gantt Chart

The Gantt Chart outlines the project timeline, ensuring transparency and tracking progress across five months. It helps the development team monitor task durations and dependencies effectively.

**Table 3.1: Project Schedule**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Task Name | May 10th | May 25th | June 10th | July 24th | Aug 20th | Estimation |
| Planning |  |  |  |  |  | 15 days |
| Research |  |  |  |  |  | 15 days |
| Design |  |  |  |  |  | 35 days |
| Implementation |  |  |  |  |  | 45 days |
| Testing |  |  |  |  |  | 25 days |
| Documentation |  | | | | | 130 days |

# Chapter 4: Conclusion

## 4.1 Conclusion

EcoTrade addresses the growing need for sustainable and community-driven book sharing by offering a responsive, location-aware web platform where users can buy, exchange, or give away books. Developed using the MERN stack and Agile methodology, the system ensures continuous improvement and adaptability based on user feedback. Its automated moderation, recommendation engine, and secure architecture contribute to a user-friendly and trustworthy environment. Through iterative development, EcoTrade not only facilitates efficient book trading but also promotes environmental consciousness by encouraging reuse and reducing waste.

## 4.2 Expected Outcomes

With the implementation of EcoTrade, users can expect a more efficient and environmentally friendly way to exchange books within their communities. The platform not only simplifies access to books but also promotes sustainability, collaboration, and digital inclusion. By integrating smart features and user-centric design, EcoTrade aims to create a meaningful impact on both literacy and eco-conscious behavior.

* Improved access to books through categorized listings
* Increased community interaction via direct messaging
* Personalized suggestions using collaborative filtering
* Reduced book waste through reuse and sharing
* Secure, scalable, and user-friendly web interface
* Encouragement of sustainable digital practices

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| --- | --- |
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