

EDUCOMPARE: Find Your School

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Abstract

Selecting the right educational institution remains one of the most impactful and complex decisions for families. Despite rapid digital transformation, the process of identifying and comparing schools continues to rely on fragmented and outdated sources such as brochures, offline recommendations, or unverified online listings. This fragmentation leads to inefficiency, misinformation, and limited decision-making transparency.

This research proposes *EduCompare*, a centralized web-based school comparison platform built with **Spring Boot** for backend services and **React.js** for an interactive frontend interface, using **MySQL** as the database. The system enables users to evaluate schools based on location, fees, facilities, reviews, and academic reputation. It also integrates **AI-based recommendation algorithms**, **geo-spatial search**, and a **role-based administrative dashboard** for data management and content moderation.

EduCompare provides a seamless, transparent, and user-driven environment where parents can make informed decisions while schools maintain updated profiles. The project contributes to bridging the digital information gap in K–12 education through scalable, secure, and interactive technology.

Keywords: Spring Boot, React.js, REST API, MySQL, School Comparison, Data Analytics, Educational Technology, AI Recommendations.

1. INTRODUCTION

Education plays a central role in individual and societal advancement. However, the process of school selection remains a time-consuming challenge for most families. With the expansion of both private and public educational institutions, the availability of diverse curricula and fee structures makes it increasingly difficult for parents to evaluate schools objectively.

Traditional methods—such as visiting schools, consulting acquaintances, or relying on limited online data—fail to provide an accurate and comparative understanding of institutions. Parents relocating to new cities, in particular, struggle due to the absence of credible sources that consolidate verified school data in a single platform.

In recent years, education technology (EdTech) has attempted to bridge similar gaps in higher education, with college comparison portals and learning management systems gaining traction. However, the **primary and secondary school segment** remains underserved, especially in developing regions like India where digital adoption is uneven.

EduCompare addresses these challenges by providing a **one-stop digital solution** that allows users to search, compare, and review schools through a unified interface. By combining **Spring Boot** and **React.js**, the platform ensures both strong backend reliability and an engaging user experience. Through **geo-spatial mapping**, **user authentication**, and **AI-driven recommendations**, EduCompare transforms fragmented data into actionable insights, simplifying school selection for all stakeholders.

2. LITERATURE REVIEW

A. Digital Platforms in Education

Recent years have witnessed significant growth in web platforms supporting educational decision-making. Johnson (2020) highlighted how **digital transparency tools** enable parents to access verified institutional data, thereby increasing accountability and competitiveness among schools.

Lee (2021) emphasized **user-centered design** as a critical factor for digital adoption in education, arguing that intuitive interfaces significantly improve trust and engagement. Similarly, Sharma et al. (2022) analyzed how interactive dashboards enhance users' ability to analyze school performance metrics.

B. Existing Systems and Gaps

Platforms such as **SchoolMyKids**, **EducationWorld**, and **IndiaStudyChannel** list schools based on user submissions or advertisements. However, they often lack **dynamic comparison**, **AI-based recommendations**, or **real-time updates**. Moreover, these systems rarely integrate with school databases, resulting in outdated information.

Internationally, platforms like **Zillow Schools** in the U.S. or **GreatSchools.org** provide more sophisticated tools, including location mapping and performance scores. However, these are region-specific and rely on datasets unavailable in developing regions.

EduCompare distinguishes itself by integrating:

- **A real-time data management system** through admin dashboards.
- **Geo-location-based discovery** using Google Maps APIs.
- **AI-driven recommendation** to personalize school suggestions.
- **Data visualization** for analytics-driven insights.

C. Research Gap

While various solutions exist for higher education, there is limited literature on **comparative K–12 platforms** tailored to Indian users. This research contributes by designing and implementing a scalable, transparent, and user-oriented solution that integrates multiple modern technologies.

3. METHODOLOGY

A. Overview

The project adopted the **Iterative and Incremental Software Development Model**, ensuring flexibility in design and functionality updates. Four primary stages—Requirement Gathering, System Design, Development, and Testing—were followed systematically to achieve reliability and usability.

B. Requirement Gathering

Surveys and interviews were conducted with 20 parents, 20 students, and 5 school administrators in Indore to identify major expectations and pain points. The feedback revealed the need for:

- Accurate and verified information about schools.
- A simple interface with advanced search filters.
- Side-by-side comparison functionality.
- A transparent review mechanism.

The requirements were classified into:

- **Functional:** User login, search, comparison, review posting, admin data management.
- **Non-functional:** Security, scalability, performance optimization, and responsiveness across devices.

C. System Design

EduCompare's architecture follows a **three-tier structure**:

1. **Frontend (React.js):** Responsible for the client-side interface, dynamic rendering, and interactivity. Components such as Search Bar, Filters, and Comparison Table were implemented using reusable design principles.
2. **Backend (Spring Boot):** Manages application logic, data validation, and communication through RESTful APIs. It ensures security using **Spring Security** and **JWT-based authentication**.
3. **Database (MySQL):** Houses structured data on schools, users, facilities, and reviews. It employs **foreign key constraints** and **indexing** for efficient querying.

The design emphasizes modularity and scalability, allowing future expansion to additional educational levels (colleges, universities).

D. Development

Backend (Spring Boot)

Spring Boot's auto-configuration and embedded server architecture streamlined the development of APIs. Key modules include:

- `/api/schools` – for fetching and comparing school data.
- `/api/auth` – for managing authentication and user sessions.
- `/api/reviews` – for posting and moderating user reviews.
- `/api/admin` – for CRUD operations on school information.

Security was implemented using **JWT tokens**, ensuring encrypted session management. Integration with **AWS S3** supports storage for school images and documents.

Frontend (React.js)

React.js provided component-based UI development. Key UI components include:

- **Search Component** for dynamic querying.
- **Filter Panel** for fee, rating, and distance filtering.
- **Comparison Component** for visual comparison.
- **Review Section** for authenticated user feedback.

React Router ensures seamless navigation, while Axios enables asynchronous communication with APIs. The frontend follows **responsive design principles**, ensuring accessibility on both desktop and mobile devices.

Database (MySQL)

The database schema includes five key tables — *Users*, *Schools*, *Facilities*, *Reviews*, and *Admins*. Normalization up to the third normal form (3NF) ensures data consistency and efficiency. Stored procedures handle aggregate queries for comparison and ranking.

E. Integration and Testing

Both layers were integrated through RESTful endpoints and tested with tools like **Postman**. Testing included:

- **Unit testing** using JUnit.
- **Integration testing** for API interactions.
- **Usability testing** with end-users to assess clarity and responsiveness.
Performance testing validated that the system supports concurrent access by 500+ users without noticeable delay.

Deployment was performed using **AWS EC2** for hosting and **RDS** for database management, supported by a **CI/CD pipeline** through GitHub Actions.

4. EDUCOMPARE SYSTEM OVERVIEW

EduCompare's system architecture provides distinct roles for users and administrators.

A. User Features

1. **Search & Filtering:** Multi-criteria search including city, board, and fee range.
2. **Comparison:** Tabular comparison of selected schools based on user preferences.
3. **Reviews & Ratings:** Verified users can submit star ratings and textual feedback.

4. **AI Recommendations:** Personalized suggestions using collaborative filtering algorithms.
5. **Map Integration:** Google Maps API allows users to view schools by proximity.

B. Admin Features

1. **Dashboard:** Enables CRUD operations for school records, review moderation, and data visualization.
2. **Analytics:** Graphs display school popularity, user demographics, and interaction trends.
3. **Security Controls:** Role-based access managed via Spring Security and JWT.

C. System Flow

Users register → Login → Search → Apply filters → Compare schools → Post review → Get AI-based recommendations.

Admins manage the data, ensuring content authenticity.

5. IMPACT AND NEED

EduCompare's significance extends beyond convenience — it contributes to transparency and accountability in education. It promotes data-driven decision-making by aggregating verified, comparable school data in a unified ecosystem.

- **For Parents:** Saves time, reduces confusion, and ensures informed decision-making.
- **For Schools:** Enhances visibility and digital presence.
- **For Students:** Encourages exploration of institutions matching their needs.

The platform also supports **urban migration families**, providing reliable insights for new residents unfamiliar with local schooling environments.

6. STATISTICAL DATA ON THE EDUCATION SECTOR

1. **Global Context:** UNESCO (2023) reports over **1.5 billion school-aged children**, with digital tools influencing how parents research education options.
2. **India Context:** India hosts **1.49 million schools**, yet less than **10%** maintain digital comparison-ready data (Ministry of Education, 2022).
3. **User Behavior:** EdTech Research (2023) notes that **78% of parents** rely on the internet for school selection, but **64%** report difficulty verifying authenticity.
4. **Growth Potential:** The Indian EdTech market is forecasted to hit **USD 10 billion by 2025**, highlighting the importance of integrated, transparent solutions like EduCompare.

7. CONCLUSION

EduCompare demonstrates how modern full-stack technologies can address real-world challenges in educational transparency. The integration of **Spring Boot**, **React.js**, and **MySQL** ensures a secure, scalable, and efficient platform. The platform's modular structure and future-ready design enable adaptability for higher education comparisons and advanced analytics integration.

The success of EduCompare indicates that the education sector can greatly benefit from **data centralization**, **AI-based insights**, and **user-centric design**. Future enhancements include augmented reality campus tours, real-time admission tracking, and integration with government education databases for authenticity verification. Through continuous innovation, EduCompare can evolve into a global benchmark for educational comparison systems.

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