**Chapter 2**

**Survey of Technologies**

**2.1 Available Technologies**

To develop an e-commerce platform tailored for a college bookstore, we explored a range of modern web frameworks commonly used in contemporary website development. This investigation led us into the broader ecosystem of server-side technologies that power dynamic online applications.

Our analysis encompassed:

* Frontend such as HTML, CSS, JavaScript, Bootstrap and React, for designing intuitive and responsive user interfaces.
* Backend frameworks including Node.js, Django, and PHP on Rails to manage server-side logic and handle requests efficiently.
* Databases like MySQL, PostgreSQL, and MongoDB to store and manage product, user, and transaction data securely.
* Performance-enhancing tools for optimization, security, and scalability—ensuring the platform runs quickly, reliably, and safely.

The primary goal was to identify technologies that best support the creation of a seamless digital experience where students can easily browse, search, and purchase textbooks and other course materials online.

**2.2 List of Technologies**



**HTML** – It is the web's official markup language which is used to develop the web page structure.

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**CSS** – Utilized for styling and designing the web page look, making it appealing.

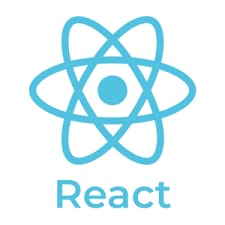
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**JavaScript** – A scripting language utilized to make web pages dynamic and interactive.



**Bootstrap** – A frontend framework to design responsive and mobile-first websites.



**React.js** – A JavaScript library to create fast and new user interfaces.



**PHP** – A server-side scripting language that is most commonly used to create the backend of web applications.



**MySQL** – A relational database to store user information, book records, orders, etc.

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**Node.js** – A runtime which enables JavaScript to be executed on the server side also.

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**MongoDB** – A NoSQL database where data is stored in adaptive JSON-like documents.

A logo of a fire base

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**Firebase** – A Google-owned platform for real-time database, authentication, and hosting.

**2.3 Comparative Study**

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| --- | --- | --- | --- |
| **Technology** | **Features** | **Advantages** | **Disadvantages** |
| **React.js** | * Components-based interface * Reusable code | * Excellent performance * Wide compatibility | * Novice learning curve |
| **PHP** | * Server-side scripting | * Easy to use * Thoroughly documented | * Can be less secure if not coded properly |
| **MySQL** | * Organized data processing | * Reliable * Fast for relational information | * Not suitable for unstructured data |
| **Node.js** | * JavaScript on server-side | * Scalable * Excellent for real-time applications | * Callback hell issue in intricate applications |
| **MongoDB** | * Document-based NoSQL DB | * Adaptive schema * Effective to process large data | * Less reliable for relational data |
| **Firebase** | * Realtime database * Hosting * Authentication | * Smooth integration * Synchronous in real-time | * Limited free plan * Too expensive in scale |
| **Bootstrap** | * Predefined CSS classes for responsive design | * Development time-saving * Mobile-friendliness | * Can make sites seem similar if not customized |

**Table 2.1 Comparative Study**

**2.4 Selected Technology**

1. Frontend: HTML, CSS, JavaScript, Bootstrap
2. Backend: PHP
3. Database: MySQL

**1. Frontend (HTML, CSS, JS, Bootstrap)**

These are lightweight, easy to understand, and best for designing a clean and responsive UI. Bootstrap is used to make the website responsive and easy to develop.

**2, Backend (PHP)**

PHP is selected since it is suitable for small and medium-sized web applications. It supports MySQL easily and is friendly with shared hosting, which is cheap.

**3. Database (MySQL)**

MySQL is a stable, documented relational database. MySQL is utilized to store book data, orders, user data, etc., safely and in a structured fashion. Collectively, the technologies assist in creating a completely functional, affordable, and simple to maintain e-commerce website for college students.