EduStream – Modern Online Learning Platform

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Project: EduStream – Interactive Online Learning Platform

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1. Introduction

EduStream is an online learning platform designed to deliver **interactive courses** with multimedia content, secure user authentication, shopping cart functionality, and real-time feedback for quizzes. The platform is designed to be **scalable, responsive, and user-friendly** across devices, providing a modern e-learning experience.

This report explains the **architecture, technology choices, implementation, and challenges** encountered while building the platform prototype.

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2. Architecture Overview

EduStream is structured as a **modern web application** with a **decoupled frontend and backend**:

Frontend: React + Tailwind

- **React.js**: Component-based framework for building a dynamic UI.
- **Tailwind CSS**: Utility-first CSS framework for rapid styling.
- **Dark Mode Toggle**: Implemented using React state + localStorage.
- **Pages/Components**:
- Landing page displaying courses
- Login/Register pages with real-time form validation
- Cart page (UI only for prototype)
- Dark mode toggle component

Backend: Laravel + MongoDB

- **Laravel**: PHP framework with built-in routing, validation, and authentication capabilities.
- **MongoDB**: NoSQL database to store users and course content. Flexible schema allows multimedia and course updates.
- **JWT Authentication**: Secure login and registration, token-based for frontend integration.
- **REST API**: Exposes endpoints for registration, login, user profile, and course retrieval.

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3. Key Features Implemented

Feature	Description
Media Gallery	Courses display video or image previews using HTML5 `<video>` and `<img>` elements.
Dark Mode	Toggle using Tailwind CSS classes; preference stored in localStorage for persistence.
Authentication	Secure registration and login with hashed passwords and JWT tokens.
Dashboard & Analytics (Prototype)	Landing page shows course list and prices. Can be extended to include progress charts.
MongoDB Dataset	Sample collections: `users` and `courses`. Used for backend integration.

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4. Implementation Challenges

1. **Tailwind + React Integration**: Fixed PostCSS plugin issues by installing `@tailwindcss/postcss` and configuring `tailwind.config.js`.
2. **MongoDB Connection**: Configured Laravel to use `jenssegers/mongodb` for MongoDB support.
3. **JWT Authentication**: Handled token storage in React via `localStorage` and ensured secure API calls.
4. **Frontend-Backend Synchronization**: Coordinated state between React UI and Laravel API.
5. **Media Handling**: Used HTML5 `<video>` and `<img>`; planned future optimization for streaming large files.

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5. Technology Justification

Technology	Reason for Use
React	Fast, component-based UI, easy state management.
Tailwind CSS	Rapid UI development, responsive design, easy dark mode implementation.
Laravel	Backend framework with robust authentication, routing, and REST API support.
MongoDB	Flexible schema for multimedia-rich courses, fast prototyping.
JWT	Secure, stateless authentication for frontend-backend communication.

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6. Setup Instructions

Backend

1. Open terminal:

```
cd edustream-backend
composer install
```

2. Configure `.env` for MongoDB:

```
DB_CONNECTION=mongodb
DB_HOST=127.0.0.1
DB_PORT=27017
DB_DATABASE=edustream
DB_USERNAME=
DB_PASSWORD=
```

3. Start Laravel server:

```
php artisan serve
```

API runs at: `http://127.0.0.1:8000/api/`

Frontend

1. Open another terminal:

```
cd edustream-frontend
npm install
npm start
```

2. Open `http://localhost:3000` in browser.
3. Verify:
4. Course list with media
5. Dark mode toggle
6. Login/Register pages

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7. Demo Suggestions

- Record a short demo video using screen capture (OBS, Camtasia, etc.).
- Show:
- Landing page with courses

- Dark mode toggle functionality
- User registration and login
- Cart interface
- Optional: Host frontend on Netlify and backend on Heroku for a live demo.

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8. Future Enhancements

- Implement shopping cart backend integration and checkout with payments.
- Add user dashboard with real-time progress charts.
- Integrate quiz functionality with real-time feedback.
- Optimize media streaming for large course videos.
- Deploy backend and frontend to cloud servers for public access.

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9. Conclusion

This prototype demonstrates a **fully functional EduStream frontend** with **dark mode, registration/login, JWT authentication, and media-rich courses**, integrated with a **Laravel + MongoDB backend**. The project is modular, scalable, and provides a strong foundation for a complete e-learning platform.

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10. Deliverables

1. **Backend Code** – Laravel + MongoDB + JWT
2. **Frontend Code** – React + Tailwind CSS
3. **MongoDB Sample Dataset** – Users and Courses
4. **Documentation & Setup Instructions** – This PDF report
5. **Optional Demo Instructions** – Suggested recording for submission