

# TRIVIATRACK

## Project Proposal

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## 1. Introduction

**TriviaTrack** is an innovative platform that transforms traditional learning and assessment methods by integrating gamification and interactive elements. The platform offers users a unique experience where learning and testing are conducted through games, making education engaging and enjoyable. A key feature is the incorporation of a virtual currency, **TriviaCoin**, which users earn by passing tests and can use to unlock additional courses or tracks within the platform. This system encourages continuous learning and provides a rewarding experience without involving real-world transactions.

## 2. Objective

To develop **TriviaTrack**, a gamified learning and testing platform that enhances knowledge retention by delivering educational content through games and interactive assessments, while motivating users with a virtual currency system (**TriviaCoin**) to unlock advanced courses and tracks.

## 3. Problem Description

**What:** Traditional learning methods are often boring and fail to engage students and professionals effectively, leading to poor knowledge retention and lack of motivation. Assessments are typically stressful and do not provide immediate rewards or incentives.

**Why:** There's a need for an educational platform that makes learning enjoyable and rewarding. By gamifying the learning experience and introducing a virtual currency system, users can stay motivated, engaged, and more likely to retain knowledge. This approach can transform the educational landscape by addressing the shortcomings of conventional methods.

## 4. Target Industry

- Education
- Corporate Training
- Professional Development
- Information Technology

## 5. Methodology

To address the problem of disengagement in traditional learning, we will develop TriviaTrack using the **MERN stack**—MongoDB, Express.js, React.js, and Node.js—for efficient and scalable web application development. The frontend will be built with React.js, enabling the creation of interactive, game-based learning modules that incorporate elements like scoring, medals, trophies, and leaderboards to enhance user engagement.

An AI-driven recommendation system will be implemented using machine learning algorithms such as content-based filtering, utilizing libraries like TensorFlow.js or

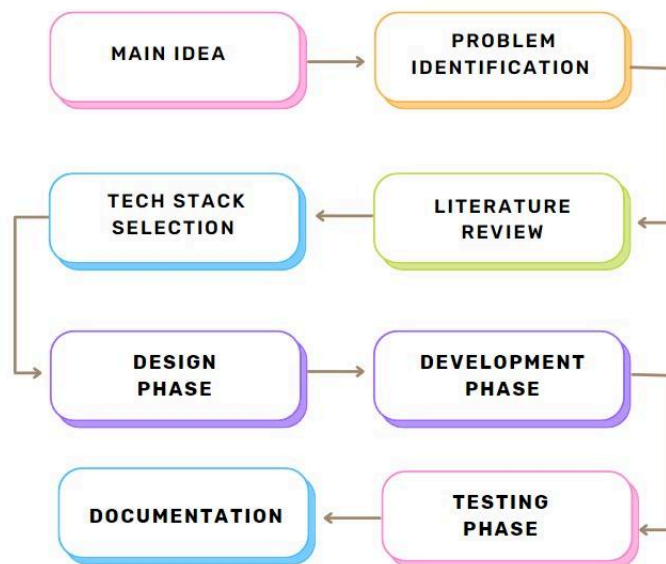
Brain.js. This system will analyze user performance and preferences to personalize learning paths and suggest relevant courses.

We will introduce a Qualification Test to assess users' existing knowledge and recommend suitable courses. Authentication and authorization will be secured using OAuth 2.0 and JSON Web Tokens (JWT). For handling payments, we will integrate payment gateways like Stripe.

Real-time features such as live Q&A sessions and peer competitions will be enabled using Socket.io for real-time communication between the client and server. The peer grading system will allow users to provide feedback and grade each other's courses, fostering a collaborative learning environment.

Our development process will follow the Agile methodology, allowing for iterative progress and adaptability.

## METHODOLOGY FLOWCHART



## 6. Project Scope

### Included:

- Development of the gamified learning and testing platform with core features.
- Implementation of the AI recommendation system.
- Creation of the virtual currency system (**TriviaCoin**) within the platform.
- Features like peer competitions, leaderboards, and live Q&A sessions.

### Limitations:

- The virtual currency (TriviaCoin) will not be buyable or sellable outside the platform at this stage.
- Development of educational content; initial deployment will use existing materials.
- Offline access; the platform assumes users have stable internet connections.
- Multilingual support; initial development will focus on a single language interface.

### Assumptions:

- Future scalability options for TriviaCoin are not detailed for future scope.
- Instructors are available to conduct live Q&A sessions and update courses.

## 7. Feasibility Study

The feasibility of developing TriviaTrack hinges on various factors, including human resources, technical complexity, and time constraints.

### i. Risks Involved:

**Technical Complexity:** Integrating an AI recommendation system, a virtual currency system and gamified assessments that work accurately with user input within the platform presents a great challenge.

- Mitigation: We will use established libraries and frameworks to ensure smooth integration and consult with AI and game development experts as needed.

**User Adoption:** One of the risks is that users may not engage with the gamified content as expected, or the learning might not be seen as effective.

- Mitigation: Extensive user testing and feedback loops will be incorporated to ensure the platform meets user needs and expectations.

## ii. Resource Requirements

### Technical Resources:

- Cloud computing services for hosting, scalability.
- Development tools & machines and software licenses (For game and for coding – VS Code/MongoDB etc.).
- APIs and Testing platforms for quality assurance.

## 8. Solution Application Areas

**Education Sector:** Enhances student engagement and knowledge retention by making learning interactive and enjoyable.

**Corporate Training:** Provides a fun and effective way for employees to develop new skills, leading to increased productivity.

**Professional Development:** Encourages lifelong learning by rewarding users and making education accessible and entertaining.

**E-Learning Platforms:** Sets a new standard by integrating gamification and virtual rewards, attracting a broader user base.

## 9. Tools/Technology

### Frontend:

React.js for building interactive user interfaces.

### Backend:

Node.js with Express.js for server-side development.

### Database:

MongoDB for efficient data storage and retrieval.

### Machine Learning Libraries:

TensorFlow.js or Brain.js for implementing AI-driven recommendations.

### Real-Time Communication:

Socket.io for enabling live interactions and peer competitions.

### Authentication/Security:

OAuth 2.0 and JSON Web Tokens (JWT) for secure user authentication.

### Payment Gateways:

Integration with Stripe API for handling transactions.

### Version Control:

Git with platforms like GitHub or GitLab for code management.

### Gamification:

Unity/Sandbox/Phaser/JS for Gamification elements.

## 10. Literature Review

Application	Description	Constraints
Kahoot!	A game-based platform for creating and playing quizzes in real-time.	<b>Surface Learning:</b> Emphasizes speed over understanding, leading to shallow learning. <b>Limited Feedback:</b> Provides minimal explanations for answers.
Duolingo	A language-learning app that uses gamification to teach languages.	<b>Repetitive Exercises:</b> Can become monotonous, reducing long-term engagement. <b>Limited Conversation Practice:</b> Lacks in-depth speaking games/activity.
Quizlet	Offers tools like flashcards and games for studying various subjects.	<b>Quality Variance:</b> User-generated content may be inaccurate. <b>Basic Gamification:</b> Simple game elements may not fully engage users.
Prodigy Math Game	A math platform using game-based learning for young students.	<b>Limited Audience:</b> Primarily designed for elementary levels. <b>Curriculum Gaps:</b> May not align with all educational standards or topics.

## 11. Expertise of the Team Members

Our team comprises two members who offer complementary skills essential to the TriviaTrack project. Both of us have a keen interest in gaming elements and have completed relevant courses in web development, database management, and UI/UX design from different platforms. One member specializes in front-end development, with a strong background in React and JavaScript, while the other focuses on back-end development, specializing in Node.js, MongoDB.

## 12. Milestones

### Project Planning (Weeks 1-5)

Roles Involved: All (primarily project team)

#### Tasks:

- Requirement Analysis
- Project Scope Definition
- Feasibility Study
- Project Plan & Schedule Development

### 2. Design Phase (Weeks 5-10)

Roles Involved: All (primarily project team)

#### Tasks:

- System Architecture Design
- Database Schema Design
- UI/UX Design

### 3. Development Phase (Weeks 10-29)

- Admin Features Development
- Develop Admin Dashboard
- Implement User Management Features
- Develop Content Management System
- Configure System Settings and Permissions
- Teacher Features Development
- Develop Course Creation Module
- Implement Live Q&A Session Feature
- Create Peer Grading System
- Set Up Certification Issuance
- Student Features Development
- Develop User Authentication & Authorization
- Implement Gamified Tests Across Genres
- Integrate AI Recommendation System
- Develop Peer Competition Features
- Implement Ranking System & Leaderboard
- Integrate Payment Gateway
- Develop Scoring and Reward System (Medals/Trophies)

### 4. Testing Phase (Weeks 20-30)

Roles Involved: All

#### Tasks:

- Test Admin Features
- Test Teacher Features
- Test Student Features
- Integration Testing
- User Acceptance Testing



## **5. Documentation (Weeks 28-32)**

Roles Involved: All

### **Tasks:**

- Technical Documentation
- User Manuals and Guides

## **6. Project Closure (Week 32)**

Roles Involved: All

### **Tasks:**

- Final Review and Testing
- Project Report Preparation
- Presentation and Demonstration

## **Features:**

### **FYP 1:**

In FYP 1 our main area of focus will be the User Interface, Database Connectivity and Basic Functionality to get the Web App up and Running with some Features and Functionalities.

- User Interface & CRUD
- Course Management Features
- User Management Features (Teacher/Student)
- Dashboard Setup
- Database Connectivity
- Peer Grading/Competitions
- Certifications
- Live Q&A Sessions

### **FYP 2:**

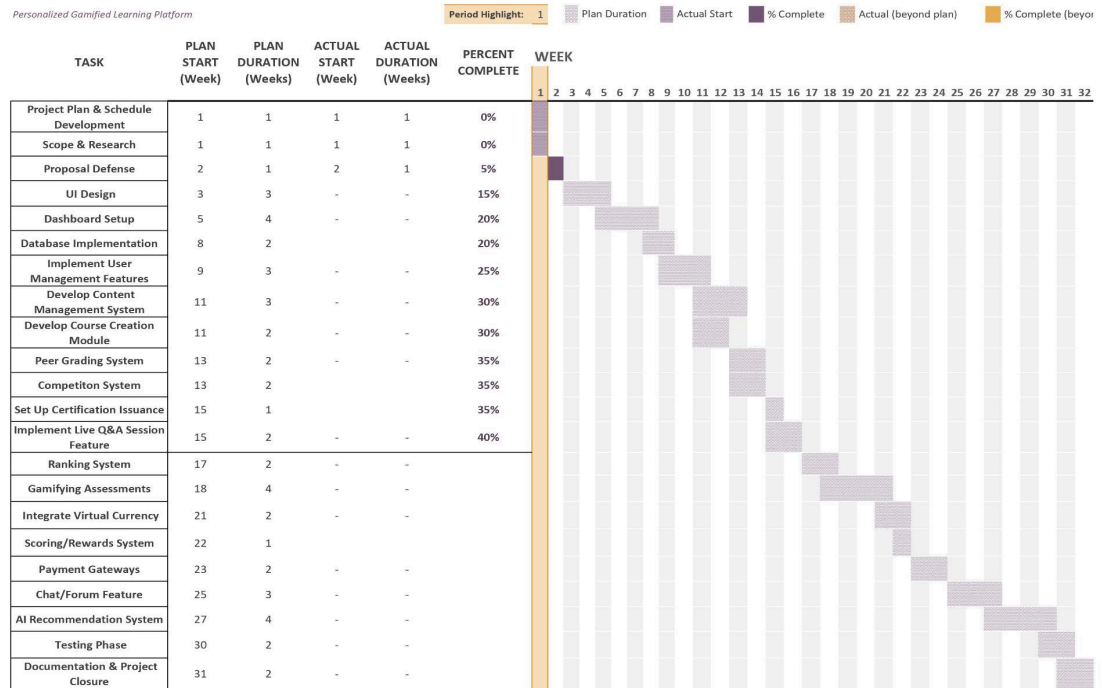
In FYP 2 Our main focus will be on building advanced features like Recommendation System, Forum, Payment Gateways and the aim will be to make TriviaTrack Stand out from all the Applications on the Internet.

- Ranking System
- Gamified Tests
- Virtual Currency (TriviaCoin)
- Payment Gateways
- Chat Feature
- AI recommendation System
- Scoring/Rewards System

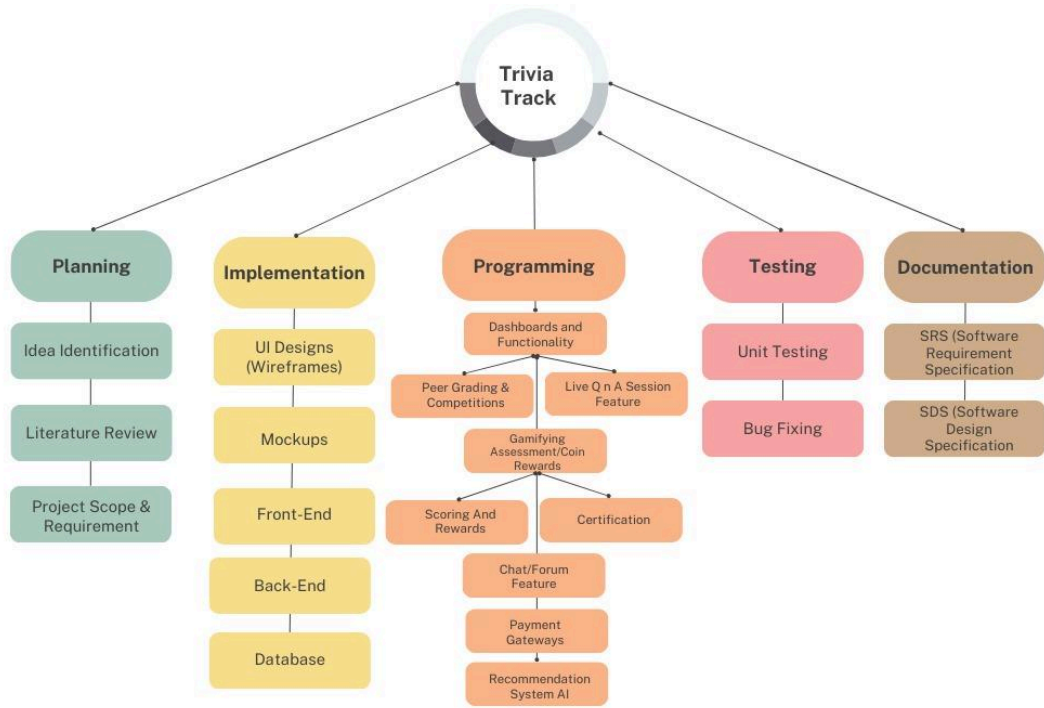
## 13. Project Schedule

### TriviaTrack

Personalized Gamified Learning Platform



## 14. Work Breakdown Structure

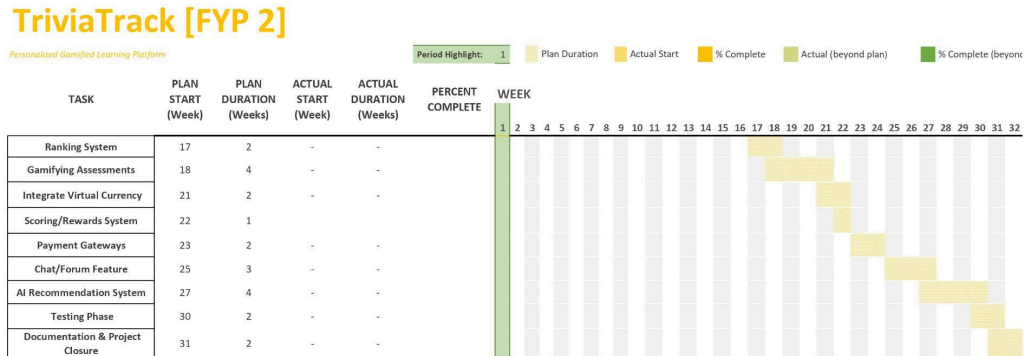


### FYP 1:

#### TriviaTrack [FYP 1]

Personalized Gamified Learning Platform



**FYP 2:**

## 15. Contribution

### Why It Will Stand Out:

**Advanced Personalized Learning:** By identifying key gaps in learning or weak points through assessments, the app can help teachers focus on specific areas of improvement for individuals, ensuring training is targeted.

**Dynamic Community Interaction:** With peer grading, live Q&A sessions, and forums, it cultivates a vibrant community that encourages collaboration and continuous learning.

## 16. References

Kahoot! Reviews. Common Sense Education. Date accessed: [20/09/2024]. URL: <https://www.commonsense.org/education/reviews/kahoot>

Duolingo Reviews. PCMag. Date accessed: [19/09/2024]. URL: <https://www.pcmag.com/reviews/duolingo>

Quizlet Reviews. Common Sense Education. Date accessed: [20/09/2024]. URL: <https://www.commonsense.org/education/reviews/quizlet>

Prodigy Math Reviews. Common Sense Education. Date accessed: [20/09/2024]. URL: <https://www.commonsense.org/education/reviews/prodigy-math>

Gametize. Assessment Inspiration. Date accessed: [20/09/2024] URL: <https://start.gametize.com/>

CodeCombat. Gaming Inspiration. Date accessed: [20/09/2024] URL: <https://codecombat.com/>