FunIPR: A Gamified Mobile Application for Intellectual Property Rights (IPR) Awareness For School Students.

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Abstract—Rights that protects your ideas and creations are very important in today's world where we use a lot of technology to help people come up with new ideas and be creative that no one has made before. However, few school students understand what an IPR is. The normal school teaching and lectures are often not enough to help these younger learners understand and remember such topics. To make this concept easier to understand, we have developed FunIPR- A mobile app that students can use and learn from that includes small quizzes, interesting stories, and fun tasks or challenges for students aged 10 to 16 years old to turn the IPR education into a learning that feels like playing a game. The app helps students to understand things about IPR in a very easy way, for example patents, trademarks, copyrights, how a product looks, rewards, and leaderboards. The front end of FunIPR has been created in Android Studio, the backend uses Node.js, and all logging in or verifying users and data storage are managed through Firebase. The project as a result supports government programs or plans such as CIPAM and NIPAM for teaching children about IPR at a young age through learning using technology or devices. First trials or early testing showed that students who used FunIPR gave an example of better understanding, better remembering things more easily, and feeling more interested and eager to learn compared with those learning through regular teaching used in classrooms.

Keywords—Intellectual Property Rights (IPR), Game-based learning, Mobile Learning, Education Technology, Android Application, Firebase, Node.js.

I. INTRODUCTION

Intellectual Property Rights are vital in safeguarding creative and innovative works of individuals by granting exclusive rights to their inventions, literary creations, or artistic expressions [1]. These laws encourage people to innovate while giving full respect to ownership. However, IPR awareness and understanding among students at school is rather limited. Most of the students do not know how various rights such as copyrights, patents, and trademarks inspire creativity, ethical use, and innovation [2].

Government initiatives such as the Cell for IPR Promotion and Management (CIPAM) of the Department for Promotion of Industry and Internal Trade, and the National IPR Policy 2016, have given much focus to integrating IPR education in schools [3]. The awareness programs available today, though conducted through various forms of workshops, seminars, and lectures, cannot retain the interest of students [4]. The challenge remains in presenting these complex legal concepts in terms relevant to the recipients and in a way that is engaging enough to the receiver.

It has been established that gamification enhances motivation and participation in learning by implementing reward structures, badges, progress bars, and challenges outside typical gaming contexts. Previous works have underlined that gamified environments enhance knowledge retention, engagement, and curiosity among learners.

To address this, the project FunIPR was developed as a mobile application that transforms traditional IPR learning into an interactive and game-like experience. It simplifies legal concepts such as patents, trademarks, copyrights, and industrial designs using story-based quizzes and activities. The app encourages self-paced learning and provides real-time feedback and achievements to boost motivation.

The rest of this paper is organized as follows: Section II discusses related works, Section III presents the system methodology and architecture, Section IV explains the implementation, Section V details results and discussion, and Section VI concludes the paper with future scope.

A. Problem Statement

Even with continuous IPR awareness programs by CIPAM and NIPAM, integration of Intellectual Property education at schools is still relatively sparse, as noted in [3]. Most awareness programs are conducted through traditional, lecture-based methods that cannot retain the interest of students for a longer period or ensure their long-term retention of knowledge in this area [4].

Legal terms such as "patent," "trademark," and "copyright" are not easy concepts for young people. The gap in providing interactive, technology-based learning has led to a deficiency in practical understanding among students in the age group of 10-16 years regarding these important concepts.

Therefore, the main issue dealt with in this project is the absence of a structured gamified learning platform that can make IPR education accessible, engaging, and effective for school-level learners. FunIPR seeks to bridge this gap by transforming IPR awareness into an interactive, game-based learning experience tailored to young minds.

B. Motivation

The inspiration for this project was inspired by the growing need for inspired by the growing need, using technology, creativity, and interactive activities in learning. Today's learners are students who

grow up with technology who use apps and interactive media easily. With using game-like elements in learning, it will move education away from just memorizing to actually taking part and exploring, which makes learning more meaningful and enjoyable. This strategy is aligned with the national policies in education such as NEP 2020, that aims at instilling creativity, innovation and digital skills at an early age and even the Digital India initiative that encourages learning to be inclusive and allows the students to participate by use of technology. To facilitate these aims, Fun lPR hopes to assist the students in learning the rudimentsary legal concepts in an easy and engaging manner on a learning platform that runs on mobile devices

The project is also based on the idea kids often start being creative at a young age. Students learning to appreciate creativity and protect others' creative work learn about ethics, responsibility, and creative ideas. FunIPR would seek to help students develop these values through an uses stories, games, and interactive activities to teach

II. RELATED WORKS

Various studies have examined gamification's potential to increase educational engagement. Koivisto and Hamari [7] proved that incorporating rewards into learning applications increases user motivation for long-term participation. In this regard, Surendeleg [8] also pointed out that gamification transforms static learning environments into interactive experiences.

In the Indian context, CIPAM [9] initiated programs for introducing IPR awareness in schools through workshops and lectures. Though these programs have been informative, they lacked digital interactivity and scalability. Katuk et al. [10] explored gamified platforms for legal education and observed notable improvements in student performance compared to traditional approaches.

Singh and Gupta [11] highlighted the requirement of digital learning for creating awareness about IPR and suggested incorporating gamification for better understanding. Similarly, UNESCO [12] recommended developing innovative and creative digital learning approaches in an interactive mode for such complex subjects as intellectual property. However, what is still lacking is the application of such methodologies relating particularly to IPR awareness for school students. The existing systems target law professionals and university-level learners, thus leaving a void at the school level. FunIPR fulfills this gap by providing an interactive mobile platform that makes learning about IPR enjoyable, accessible, and effective.

Table 1: Comparison of Existing IPR Awareness Methods

Method	Description	Drawbacks
Workshops & Seminars	Conducted in schools to explain IPR basics.	One-time sessions, limited engagement.
Printed Booklets	Distributed under CIPAM/NIPAM initiatives.	Content without interaction, so students lose interest easily.
Classroom Lectures	Teacher-led discussions on IPR topics.	Passive learning, less interactivity.
Online PDFs & Videos	Learning materials and videos available on official government websites.	Lack of game-based learning or progress tracking.
FunIPR (Proposed)	An interactive, game-based mobile app designed to make IPR learning simple and engaging for students.	Easy to use, can reach more students, and helps them remember better.

III. SYSTEM DESIGN AND METHODOLOGY

The architecture of the proposed FunIPR system is divided into four layers:

Presentation Layer:

Manages how users use the app that gives a simple android layout Users can sign up as students, open lessons, play quizzes, and view rewards, while teachers can see their progress on a dashboard.

Application Layer:

This holds the game logic, progress tracking, and the quiz engine of the game. It manages how users interact with the content and makes sure the scores, levels, and rewards are updated dynamically.

Backend Layer:

This Node.js server mediates between the front-end and Firebase database, enabling data flow as well as authentication and leaderboard updates [13].

Data Layer:

This system will run on Firebase Firestore, which enables real-time storage of quiz questions, user information, scores, and rewards. The user's security is guaranteed since Firebase handles all the authentication.

The layered approach ensures modularity, scalability, and data security.

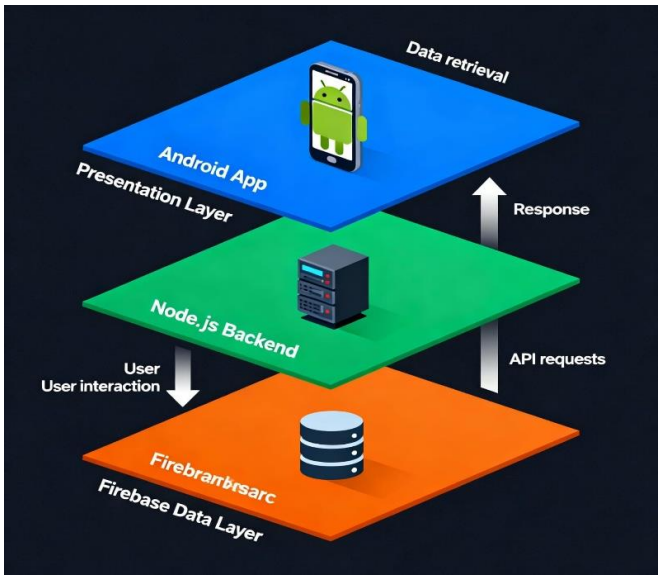

Figure 1: Layered Architecture of FunIPR (Android App → Node.js → Firebase).

IV. IMPLMENTATION

The FunIPR application was developed with the incorporation of a student-centered approach, where each functionality was embedded with the aim of making the learning process of the pupils interactive, straightforward, and enjoyable for both students and teachers.

Frontend (Android Studio):

The interface of the application was designed in Android Studio using XML and Java. it has visually appealing screens to use in logging in, lessons, quizzes, and rewards. The layout was kept clean and easy to navigate so that even younger students can use it without difficulty.

Backend (Node.js):

The app is supported with the help of Node.js, which allows to maintain the process of real-time communication between the app and the database and makes updating the quiz results, awards, and student status a seamless and immediate process at the time of using the app.

Database: Firebase Firestore

Firebase Firestore is secure in that it stores user data, such as profile, quiz questions, results, and achievements. The best part about this is that it enables the information to be stored safely in the cloud and can be brought synchronized to various devices as and when needed. Firebase also handles the authentication process where only the authorized users are allowed to log in and use their accounts.

Modules Implemented:

Login Module: This enables students and teachers to log in or create an account securely using firebase authentication.

Lesson Module: Introduces the main topics of Intellectual Property Rights in simple and visual language so that students can understand each concept in an easy way.

Quiz Module: The module will contain small fun quizzes and have immediate feedback, which will assist students in checking their knowledge and learning by mistakes.

Reward Module: Badges and achievements appear every time when students accomplish lessons or in case, they do good in quizzes, which encourages them to study more.

Teacher Dashboard: This gives teachers an opportunity to track progress of students in a far easier manner, compare scores and participation.

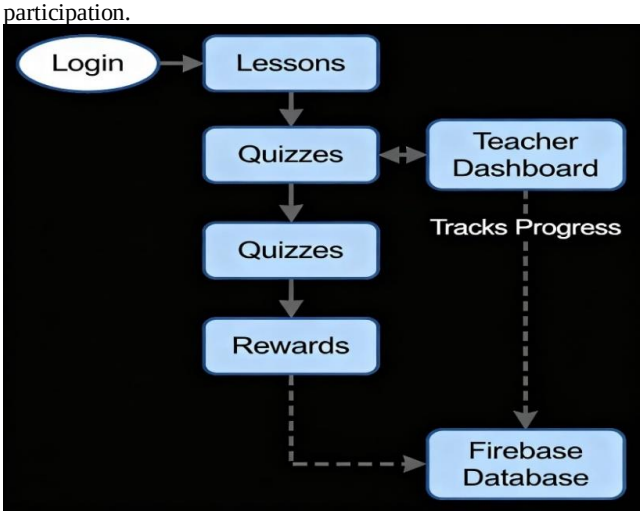

Figure 2: User flow in FunIPR — starting from Login, then Quiz, followed by Rewards, and finally saving information to the database.

V. RESULTS AND DISCUSSION

It involved the collaboration of two local schools with a total of 30 students aged 10-16 years and 4 teachers who were asked to use the FunIPR app. For effectiveness, students were given a short test before and after using the app to compare their learning progress.

A. Quantitative Analysis:

Upon the application of FunIPR, the mean quiz score of the students increased by 38, and this was a clear indication of a greater understanding. Indeed, approximately 92 percent said that the app helped them enjoy and follow the IPR learning. The teachers also reported that the teacher dashboard had been of great help in tracking the progress of every student and his/her involvement.

B. Qualitative Analysis:

The challenges that involved quizzes and the immediate feedback they provided immediately after each question were one of the things the students appreciated. The game like functions, badges, and leader boards made the learnings more interesting and a feeling of competition amongst them.

Teachers also testified that it was much easier to teach hard to grasp IPR concepts using visual lessons and story-based modules. Overall, this app helped students be more engaged in what they are learning and remember what they had learned compared to regular lecture-based teaching, showing how effective gamified learning can be for subjects like IPR and creative education.

VI. CONCLUSION AND FUTURE SCOPE

This paper presented a gamified mobile learning application, FunIPR, developed with the purpose of making learning about IPRs simple and entertaining for school students. Complex topics with respect to IPRs, such as patents, trademarks, and copyrights, are made interactive through games, quizzes, and rewards.

With the help of game features and digital learning tools, FunIPR allows students not only to study the concepts of IPR but also the way they can be demonstrated in real life. The gap between theory and practical knowledge is bridged as students are able to learn through playing and exploring.

The project also supports the Government of India's vision to spread IPR awareness and add creative learning methods to school education. Because of its ease in usage, the app can be used both in classrooms with teachers and at home by students themselves. All in all, FunIPR promotes creativity, ingenuity, and appreciation of originality among the young learners.

In the future, the application can be extended to include:

Furthermore, the application has an AI-powered quiz that is designed with the learning level of the particular student in mind to have a more customized experience. It also gives the choice of languages used in various places hence students in various places learn to their convenience.

Lessons based on AR can allow students to see and experience how inventions and trademarks work in real life.

It can also worked together with a national education platform to reach out to more schools and learners throughout the country.

As FunIPR demonstrates, game-based learning properly used can even make such complicated subject as IPR fun, interesting, and easy to learn, at least among young learners.

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