EduCraft: スケーラブルなオンライン教育のための マルチドメイン学習管理インフラストラクチャ

EduCraft: A Multi-Domain Learning Management Infrastructure for Scalable Online Education

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Abstract

大規模なオンライン教育を支えるためには，デジタル学習環境において柔軟性，安全性，そして高い教育的有効性が求められる。現在広く利用されている Moodle や Google Classroom などのプラットフォームは，基本的な授業配信や評価機能を提供しているものの，多くの既存 LMS には高度な自動化，AI による学習支援，安全な認証機構，リアルタイム通信，デジタルライブラリへのアクセス，実践的なプログラミング演習，ならびに知的な出席管理機能が十分に備わっていない。これらの制約は，学習者の主体的な参加を妨げ，特にプログラミング教育の効果を低下させる要因となっている。これらの課題を解決するために，本研究では EduCraft を提案する。EduCraft は Django を基盤としたマルチドメイン型 LMS であり，32 の体系的なコーディングコースを提供するとともに，C，C++，Java，Python，JavaScript，Kotlin，SQL，PHP，C# など複数言語に対応した統合オンラインコンパイラを備え，ブラウザ上でのリアルタイムなコード実行を可能にしている。さらに，ライブ授業およびオンデマンド授業の双方に対応した自動出席管理システムも搭載している。本システムは学生および教員によって反復的に開発・評価され，その結果，高いユーザビリティ，負荷下での安定性，ならびに授業運営における有効性が確認された。総じて，EduCraft は知的支援技術を統合した，拡張性・安全性・教育的有効性に優れたプラットフォームであり，次世代のデジタル学習環境のモデルとなる LMS である。

Digital learning environments must provide flexibility, security, and instructional effectiveness to support large-scale online education. While platforms in-use such as Moodle and Google Classroom offer basic course delivery and assessment features, existing LMS lack advanced automation, AI-driven assistance, secure authentication, real-time communication, digital library access, hands-on programming practice, and intelligent attendance tracking. These limitations reduce student engagement and hinder effective programming instruction. To address these gaps, this work proposes EduCraft, a Django-based multi-domain LMS offering thirty-two structured coding courses and an integrated online compiler supporting multiple languages (including C, C++, Java, Python, JavaScript, Kotlin, SQL, PHP, and C#), enabling real-time code execution directly in the browser. EduCraft also includes an automated attendance marking system for both live and offline classes. Developed and iteratively evaluated by students and teachers, our system demonstrates high usability, stability under load, and effectiveness in course delivery. Overall, EduCraft provides a scalable, secure, and pedagogically robust platform that integrates intelligent support technologies, serving as a model for next-generation digital learning environments.

Keywords: Learning Management System, Intelligent Tutoring System, Live Class Integration, AI-Enhanced Learning, Online Course Management, Scalable Web Application

1. Introduction

Worldwide boom of digital learning has changed the format, production, and delivery of academic content from educational institutions. With the proliferation of online and blended learning, there is an explosive emergent demand for flexible, secure, user-friendly, dynamic and

interactive Learning Management Systems (LMS) [1, 2]. Currently available LMSs (Moodle, Google Classroom, Canvas etc.) offer purposeful features that are essential for course delivery and student assessment in virtual modes; nevertheless, contemporary education calls for more advanced feature such as secure authentication and / authorization support, Artificial Intelligence (AI) assisted learning aid, automated assessment, real-time immediate communication, and easy access to digital resources [3, 4].

In computing education, there is a strong need for LMS platforms that support immediate, hands-on programming through integrated online compilers for real-time coding practice. Additionally, automated attendance tracking is essential for monitoring participation in both synchronous and asynchronous sessions. As automation and intelligent personalization become increasingly important, the demand for an LMS that seamlessly integrates these capabilities has become central to modern digital education [5].

1.1 Problem Statement

Until now, there has been none all-encompassing, openly available environment for secure Google Authentication, detailed course management support, AI tutoring systems, digital libraries, real-time communications with learners/scholars, and multi-language mediated online compilers & auto-attendance solutions. In addition, such incoherent features push students and educators to depend on disparate third-party software and tools, decreasing learning efficacy and causing a resulting upward movement in administrative demands.

As evidenced in the previous research, LMS solutions have to develop new functionalities such as intelligent tutoring, effective automation and offer connected digital resources, that amply cater to contemporary learning requirements [6]. Prevalent Learning Management Systems (LMS) provide basic content delivery but lack effective support for hands-on programming and real-time instruction. Most platforms do not offer integrated multi-language coding environments for supporting languages, for instance: Python, Java, C/C++, JavaScript, SQL, PHP, Kotlin, and C#, which limits practical coding experiences. Moreover, some advanced features such as AI-assisted learning tools, secure authentication mechanisms, automated attendance tracking, and unified access to quizzes, live classes, payments, and digital libraries are often missing or feebly implemented. These limitations reduce users' engagement, increase administrative overhead, and prevent LMS platforms from delivering a fully integrated learning ecosystem.

1.2 Research Objective

① General Objective: To design and evaluate an integrated LMS (aka EduCraft) that supports digitally enhanced education through secure, scalable, and intelligent technologies.

② Specific Objectives: Proposed project aims to develop a modular, Django-based LMS [7] tailored for programming education. System supports multi-language coding environs, allowing students and instructors to write and execute code directly within the platform to promote experiential learning. Secure access is ensured through Google OAuth authentication with role-based authorization. Several core academic activities (assignments, quizzes, grading, and attendance tracking) are automated to reduce administrative effort. Designed platform provides real-time communication features, including live chat, messaging, and announcements as well, to support collaboration. Integration with Google Books enables access to additional learning resources, while an AI-assisted tutor offers personalized learning support. Finally, prototype system is evaluated in terms of usability, performance, and user satisfaction to ensure its effectiveness for both students and instructors.

1.3 Research Questions

◦ How do you include a real-time code-writing tool (multi-language online compiler) in an

LMS written upon Django: a high-level Python framework for web development?

- What is the best design for having a segregated log-in, auto-checking, and active / interactive communication?
- What impact will AI tutoring have on student engagement / learning outcomes in an LMS setting?
- In what ways does EduCraft enable teachers to become more efficient in course and assessment management?
- What are user perceptions about the usability, performance, and overall learnability features of EduCraft?

1.4 Significance of Research

A comprehensive, holistic LMS's design and development plan is put forward in this work. EduCraft has an enormous user-base. Offered platform matches the learning requirements of institutions thereby offering real-time coding support with AI-driven assistance, online learning resources, and efficient assessment tools that enhance student engagement [8, 9]. Educators benefit from automated grading, attendance tracking, and in-class exercise management, significantly reducing workload [10]. Built on a modular Django architecture, EduCraft is secure, scalable, and cost-effective, making it suitable for both introductory and advanced programming courses while enabling future integration of intelligent learning technologies.

1.5 Scope and Limitations

Research phases focused on testing, debugging, and prototyping EduCraft's core features, including the online programming compiler, AI tutor, turnout automation, assessments, communication tools, payment integration, and digital library. Testing was conducted with a small user group; large-scale evaluation with hundreds of learners remains the future work. Advanced predictive analytics and adaptive learning features were out of scope due to time constraints but are planned for future development.

2. Literature Review

This section reviews contemporary research and literature related to modern e-learning systems. It examines current technologies for programming education, intelligent learning tools, digital libraries, authentication mechanisms, and online connect facilities. Key objective is to analyze latest learning technologies, identify the strengths and limitations, and establish the motivation for developing EduCraft LMS.

Literature review is organized into six major themes: evolution of LMS and striking challenges, limitations of existent LMS platforms, AI-enhanced instructional systems, interactive pervasive online programming environments, and integration of digital libraries plus real-time collaboration tools. Finally, highlights on unresolved research gaps that form the foundation for proposed idea, are rendered.

2.1 Challenges ¦ Current LMS

Digital learning has grown rapidly over the past decade due to hi-tech advancements and increasing call for flexible education [11]. Popular LMS platforms such as Moodle, Blackboard, and Canvas provide virtual settings for content delivery, assessment management, and student–teacher communication. Studies indicate that LMS usability, interface quality, and interactive tooling strongly influence the effectiveness of online learning.

While standard LMS features — course authoring, quizzes, notices, announcements and gradebooks, are widely adopted, shift toward skill-based and programming-centric education poses new demands. Lately, LMS platforms must support hands-on coding practice, multimedia content, peer discussion, and real-time interaction. Still global transition to digitally enhanced education highlights the need for

scalable platforms that support high concurrency, personalized learning, and seamless integration with external tools and APIs [12].

2.2 Restraints ¦ Existing LMS Platforms

Despite the widespread use, many LMS platforms exhibit significant limitations. Most systems lack built-in, multi-language online coding environments and provide limited real-time feedback for the programming chores. Likewise, secure and rapid authentication mechanisms are often insufficiently implemented, and attendance tracking frequently relies on tedious manual processes.

AI-oriented intelligent learning assistance remains underdeveloped or inattentive in most platforms. Additionally, access to concise digital libraries is limited, and integration with external applications, such as communication tools or coding platforms, is frequently fragmented. As a result, students and instructors must have to rely on multiple external services for coding, communication, assessment, and numbers tracking, increasing complexity and administrative burden. These confines indicate that traditional LMS platforms are in fact not fully equipped to support up-to-date, hybrid, and programming-intensive educational environments.

2.3 AI-Enhanced Instruction ¦ Intelligent Tutoring Systems

Recently, artificial intelligence has significantly transformed digital learning by enabling personalized instruction, real-time feedback, and adaptive content delivery. AI-mediated systems can assist students with problem-solving, provide instant support during coding tasks, and recommend learning paths based on individual performance. Such systems also lessen instructional workload by automating feedback, grading, and learner monitoring.

AI-driven chatbots and Intelligent Tutoring Systems (ITS) can interact with learners continuously, offering support beyond scheduled class hours. These can regularly assist with live instruction, assessment, and content generation. Yet most existing LMS platforms lack comprehensive integration of these intelligent tools. EduCraft addresses this gap by incorporating an adaptive AI tutor within a unified platform, enabling personalized learning experiences for both students and instructors.

2.4 Interactive Coding Settings ¦ Real-World Tools

Programming education requires more than static instructional content; it demands interactional atmosphere where learners can write, execute, and debug code in real time. Research shows that hands-on online coding tools significantly improve conceptual understanding in computer science education. Although cloud-based IDEs and online compilers exist, most traditional LMS platforms do not natively support multi-language code execution. Institutions often rely on third-party services, resulting in fragmented workflows and reduced usability.

EduCraft addresses this limitation by integrating a multi-language online compiler directly within the LMS, supporting languages such as Python, Java, C, C++, JavaScript, and PHP, thereby enabling seamless programming practice within the learning environment.

2.5 Digital Libraries ¦ Cloud Integration

Digital libraries enhance learning by providing access to global academic resources and improving research skills. However, many LMS platforms offer limited library support or rely solely on external links. Integration of APIs e.g., Google Books API significantly improves resource discovery and academic engagement [13, 14]. Cloud-based LMS architectures further enable scalability, high availability, real-time communication, and efficient multimedia management. Such sort of architectural artefacts also simplify integration with third-party services. EduCraft leverages a cloud-compatible,

modular design and integrates Google Books API to deliver comprehensive access to materials within the LMS assembly.

2.6 Filling-up the Research Gaps

Related works reveal that most existing LMS platforms lack an integrated multi-language online compiler, AI-based tutoring systems, and robust intelligent learning support. Secure OAuth-based authentication is inconsistently implemented [15], and digital library integration is often limited. Automated attendance tracking and real-time communication tools are also insufficient in many systems.

Furthermore, few LMS platforms are developed using scalable and modular frameworks such as Django, which are critical for long-term extensibility and adaptability [16]. These constraints highlight the need for a unified, secure, and intelligent LMS solution. EduCraft is proposed to address these voids by integrating advanced learning tools, AI-driven support, secure authentication, and modular scalability within a solo comprehensive platform.

3. Methodology

Design, actualization and evaluation of EduCraft LMS follow a concrete system development research scheme that's outlined in this section. The practice comprises of requirement analysis, system design, implementation, and testing and evaluation. This structured approach is widely adopted in research focused on developing cutting-edge technological solutions for e-learning networks.

3.1 Research Strategy

Development approach follows an iterative build-and-evaluate methodology, well suited for creating and validating interactive software tools. Early, process begins with requirement analysis and initial design, followed by prototype development, deployment, and continuous refinement based on user feedback. This approach enables early testing of functionality, performance, and usability. System design defines both functional requirements and performance constraints, outlining how system's components interact.

Portal's frontend interface is carried out using JavaScript-based web technologies, while core processing is handled in backend. Security is supported through third-party services such as Google authentication, and external APIs are integrated for digital library access, online code execution, and payment processing. Comprehensive testing is conducted to verify functional correctness, performance, security, and usability. Evaluations involve both students and teachers, focusing on system value and user satisfaction. This iterative approach ensures that system remains consistent, efficient, and aligned with educational goals.

3.2 Requirement Analysis

System requirements were identified through a combination of comparative analysis and stakeholder consultation. Existing LMS platforms such as Moodle, Google Classroom, and Canvas were studied, alongside a review of relevant academic literature and discussions with teachers and students. Based on these insights, customized components were defined to address both educational and technical needs [17]. Teachers and students can create and manage courses, lessons, and assessments, while an integrated online coding environment enables practical learning and experimentation. Attendance tracking is automated for live sessions, and an AI-based learning assistant provides personalized guidance. Communication traits include discussion boards and real-time chat, complemented by access to an online digital library for extended learning resources. Secure payment options are included for paid courses, and role-based access control assigns users as administrators, teachers, or students to ensure safe and expert system operation.

3.3 Conceptual Design

EduCraft is built on a three-tier architecture, enabling clear separation of concerns and ease of maintenance. Presentation Layer delivers the User Interface (UI) using Django templates along with HTML, CSS, JavaScript, and Bootstrap to provide a well responsive and engaging user involvement. Application Layer handles core system logic, where Django processes user requests, manages data flow, enforces policies, and coordinates services such as the online compiler and learning workflows.

Data Layer manages persistent storage using SQLite or PostgreSQL for structured data, with MongoDB supporting unstructured content such as real-time chat messages. System also integrates external services, including Google Books for digital library access, Judge0 (or equivalent) for online code execution, and payment gateways such as SSLCommerz and Stripe for secure transactions. Subject architectural design supports rapid development, scalability, and seamless count of new features, enabling LMS to grow capably over time.

3.4 System Implementation (BackEnd)

EduCraft is built on the Django framework, providing a robust and scalable system foundation. Python is used to implement core features such as code execution, attendance tracking, and AI Tutor, enabling academic automation. Data management relies on Django's built-in tools to ensure consistency and integrity. Role-based access control enforces appropriate permissions for different user types. Overall, prototype ensures secure, reliable, and efficient platform operation.

EduCraft LMS, illustrated in Figure 1, integrates pedagogical, technological, and professional components into a unified digital learning ecosystem. It offers free foundational programming courses with optional paid advanced modules and automatically issues verifiable online certificates upon completion. Core features include structured course delivery, plagiarism detection, digital library access, and real-time communication via Zoom and Google Meet. Platform incorporates intelligent tools such as online assessments, a multilingual coding compiler, and an adaptive AI tutor that provides personalized learning support.

Additionally, EduCraft supports career development through résumé generation, internship and job assistance, innovation rewards (ThinkCash), and virtual hackathons that promote collaboration and creativity. Figure 2 presents the EduCraft Fusion Model, illustrating the collaborative, multi-team development workflow across the system's lifecycle.

3.5 Prototype Implementation (Frontend)

Frontend UI provides a responsive interface built with HTML5, Bootstrap 5, Tailwind CSS, and JavaScript, ensuring consistent performance across desktop and mobile devices. It supports interactive coding, live classes, and discussion forums within a unified environment. An integrated online compiler enables users to write, execute, and test programs in multiple languages, including Python, Java, C, C++, JavaScript, PHP, and SQL.

Automated attendance tracking, records the participations accurately, during simulated live sessions. Our platform also includes an AI-powered learning assistant for real-time personalized guidance and a digital library offering access to free books, research papers, academic materials, and other technical resources of publishing houses, and so on. Secure payment integration manages enrollments and transactions safely and transparently.

3.6 Testing & Evaluation

Functional Validation: Comprehensive functional testing confirmed system accuracy and reliability. Black-box, link, and API tests verified authentication workflows and core features, including course navigation, automated quizzes and grading. Online compiler, attendance automation, and communication modules

operated correctly and remained stable thereby meeting the required functional standards.

Performance Testing: Evaluations assessed stability and efficiency under varying workloads, focusing on concurrency, throughput, execution speed, and resource usage. EduCraft remained stable and responsive during high-traffic simulations, with no notable performance degradation, demonstrating suitability for large-scale deployment.

Usability Evaluation: Assessed through task-based testing with students and instructors, emphasizing interface clarity, responsiveness, and AI tutor effectiveness. Feedback reflected high user satisfaction, ease-of-use, improved engagement, and a positive learning experience, confirming EduCraft as an intuitive and efficient platform.

4. System Architecture & Design

EduCraft LMS adopts a scalable, modular, multi-layered architecture to ensure robust execution and unified integration of learning services. It's organized into Presentation, Application, and Data layers, enabling clear separation of concerns, easier maintenance, and secure, extensible deployment for coding-focused tutoring.

Practitioners, learners, and educators access core tools such as a multi-language online coding compiler, structured courses, certifications, plagiarism detection, digital library, real-time communication (Zoom/Google Meet), AI-assisted résumé tools, internships, and hackathons. Instructors receive additional capabilities for managing courses, assessments, and live classes, while administrators oversee users, enrollments, and system operations via a centralized dashboard.

4.1 Application Layer (FrontEnd Interface)

Presentation Layer handles all user interactions in EduCraft and is implemented using Django Templates, HTML5, CSS3, JavaScript, Bootstrap, and Tailwind CSS. It provides a responsive and consistent interface for administrators, teachers, and students across desktop and mobile devices. Role-specific views support access to courses, assignments, assessments, instructional media, the online coding environment, live classes with attendance tracking, communication tools, digital library search, and announcements. Overall, this layer ensures smooth navigation, usability, and an engaging user experience.

4.2 Use-tier (Business Logic Layer)

Application Layer constitutes the core of EduCraft LMS and is implemented using the Django framework, utilizing its MVC (Model-View-Controller) structure, secure ORM, and modular design. It manages authentication via Google OAuth 2.0, enforces role-based access control, and supports key academic operations such as course management, assignments, assessments, and content uploads. Stated layer integrates a multi-language online compiler for secure in-platform code execution, along with automated grading, late submission handling, and attendance tracking.

Moreover, it directs communicate services and connects with external APIs, including Google Books, payment gateways, and the EduCraft AI Tutor, to provide digital resources, protected transactions, and personalized learning support, ensuring unfailing and resourceful system operation [18, 19]. Security is ensured through OAuth 2.0 authentication, encrypted sessions, and secure HTTPS communication. Role-based access control with frontend and backend validation protects data integrity and access permissions.

4.3 Data (Database and Storage) Layer

Data Layer provides shielded and centralized storage for all EduCraft system data. It is implemented using a relational database such as PostgreSQL or SQLite, with optional MongoDB support for unstructured data like chat logs. This

layer manages key entities including users, courses, assessments, attendance, payments, system logs and communications. So far data integrity and performance are maintained through Django's ORM (Object-Relational Mapping), ensuring consistent and reliable data management across the platform.

Figure 3 illustrates the database relationships of EduCraft system. Data layer is built on a normalized relational schema designed to ensure scalability, consistency, and data integrity across all functional modules.

Central to architecture is the User entity, which manages authentication and authorization and is extended through associations with Profile for enriched user metadata and **OAuth_Account** for secure third-party verification. Course entity forms the backbone of academic subsystem and is hierarchically linked to Quiz and Assignment along with their respective tracking tables (**Assignment_Submission** and **Quiz_Attempt**) to enable detailed monitoring of learner performance and activity.

Support for synchronous learning is provided through **Live_Class** and **Attendance_Session**, enabling real-time teaching and attendance tracking. Communication is handled through **Chat_Thread** and **Chat_Message**, facilitating scalable discussions and instructor–student interaction. Schema contains **AI_Chat_Log** for storing interactions with intelligent tutoring services, Payment for managing enrollment and billing data, and **Book_Search_Log** for analytics related to digital library usage. Overall, the database design is modular, logically structured, and analytics-ready, supporting EduCraft's integrated learning, smart services, and real-time collaboration features.

4.4 Integration with External Services

EduCraft integrates multiple third-party APIs to enhance functionality, security, and learning effectiveness. Google OAuth is used for secure authentication and user management, while the Google Books API provides access to a wide range of digital learning resources. External online compiler API (e.g., Judge0 or equivalent) enables in-platform code execution for practical programming activities. A payment gateway API supports secure course enrollment and transaction processing. In addition, the EduCraft AI Tutor leverages state-of-the-art generative model APIs to provide intelligent academic assistance and personalized support. Together, these integrations allow EduCraft to deliver learning content, coding tools, and smart services within a unified platform.

Proposed LMS adopts a robust N-tier architecture to ensure modularity, scalability, and clear separation of concerns as illustrated in Figure 4. Users interact through a client and presentation layer built with Django Templates, while core business logic (authentication, course management, and automated grading) is handled within application layer via Django Views and RESTful APIs. Data persistence is managed through data access layer and a relational database (PostgreSQL), with optional storage for unstructured back-logs using ORM-based access. Conceptual architecture also supports secure third-party integrations, payment gateways, and future AI-based progressive learning microservices.

5. Result & Discussion

Prototype system is assessed through functional and performance testing, along with usability and user-feedback from students and teachers in a real academic setting. Figures 5–16 illustrate key interfaces, user perspectives, and some selected code excerpts.

5.1 Functional Endorsements

EduCraft's core functionalities are thoroughly tested and operated reliably. Google OAuth authentication and role-based access control works correctly for administrators, teachers, and students. Course and lesson management enables smooth content upload and access across desktop

and tablet devices. Integrated online compiler supports twenty-two programming languages, allowing in-platform coding without any external tools whatsoever. Assignments, quizzes, attendance tracking, and report generation functioned precisely in both online and offline modes. Digital library (Google Books API), communication tools, and payment gateway, all performed reliably indicating readiness for dependable deployment.

5.2 Performance Findings

Performance testing evaluated EduCraft's speed, stability, and scalability. System remained stable with over 300 concurrent users, maintaining course page-load times under 900 milli-seconds during peak usage. Average response times stayed below 2 seconds for authentication, 0.8 second for lesson loading, and 1.5 second for quiz submission and grading. Database evaluations using PostgreSQL and SQLite showed efficient read/write performance with no deadlocks or bottlenecks, confirming reliable operations under high load.

5.3 Usability Evaluations

Usability was assessed through observation, user testing, and short surveys. Students reported positive experiences with the clear interface, easy navigation, instant quiz grading, AI tutor support, and integrated coding environment, with 92% perceive improved learning. Educators highlighted promising and resourceful course management, automated grading and attendance, and better communication, with 88% stating that EduCraft significantly enhanced teaching efficiency.

6. Conclusion

EduCraft integrates core LMS features — such as an online compiler, AI tutor/coach, pertinent authentication, digital library, communication tools, automated assessment, and billing — into a unified platform. System demonstrates strong performance and scalability under concurrent usage, while automation reduces teachers' workload and real-time tools improved student engagement. Overall, users found EduCraft usable, efficient, and effective for online learning. Experimental results confirm that EduCraft LMS is a secure, scalable, and user-friendly platform for modern-day digital education. It exhibits stable functionality, strong performance, and positive user feedback, establishing a reliable foundation for imminent LMS actualization, particularly for programming-oriented institutions.

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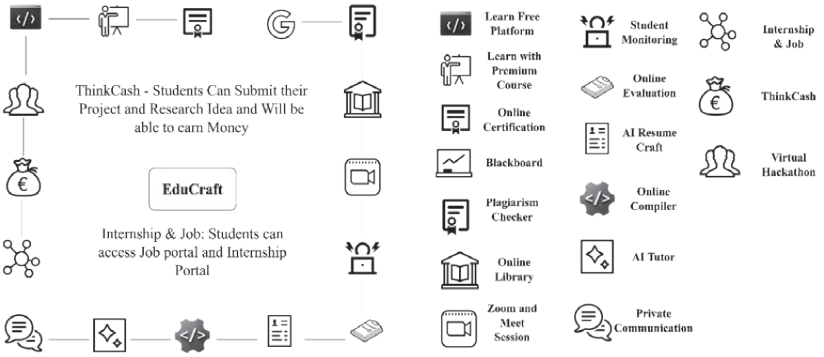

Figure 1: Salient Features of Proposed System — EduCraft

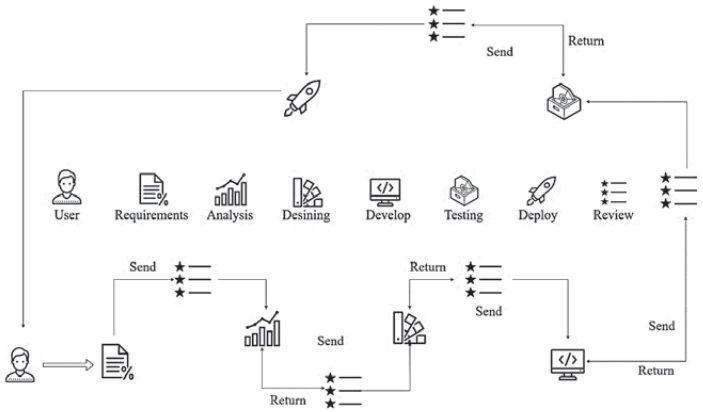

Figure 2: Fusion Model of EduCraft Portal

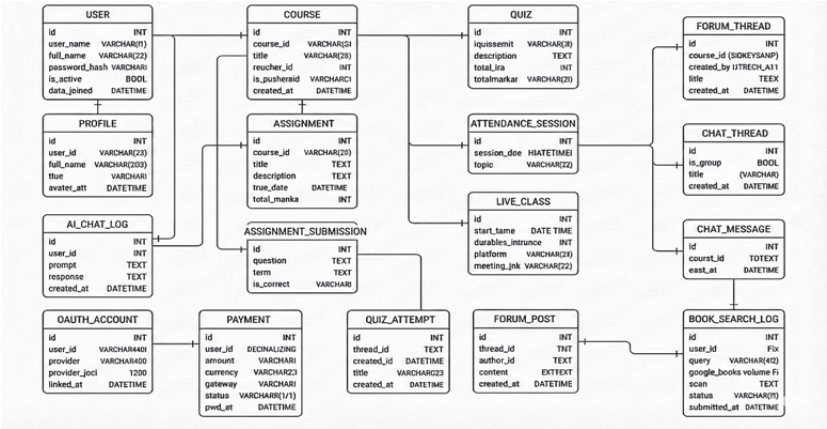

Figure 3: Schematic Diagram of EduCraft's Database

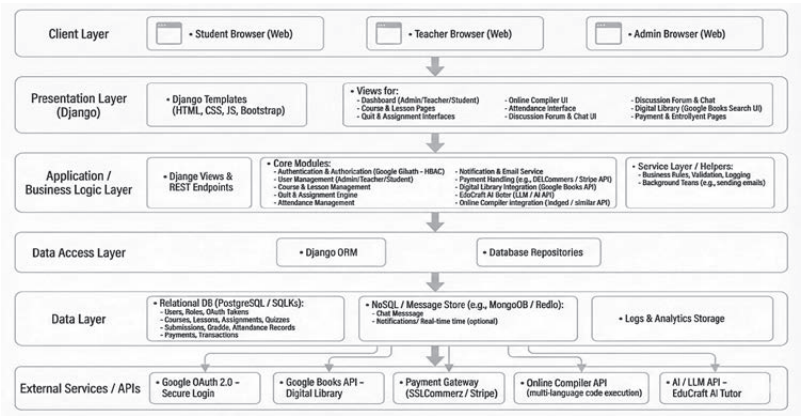

Figure 4: Schematic of EduCraft's LMS Framework

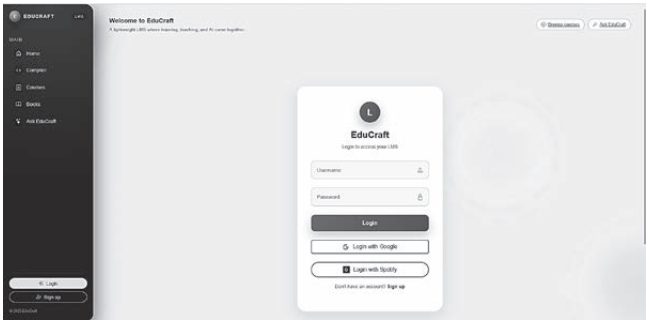

Figure 5: EduCraft's Login Workflow

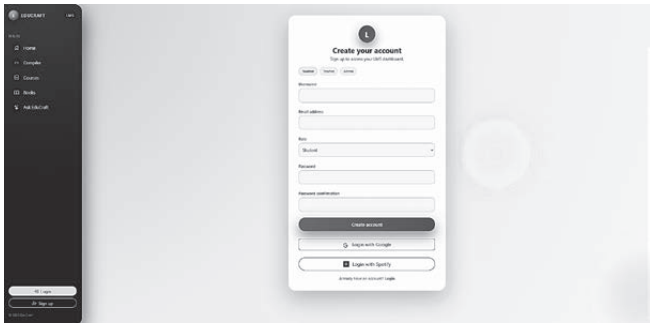

Figure 6: EduCraft's Register Workflow

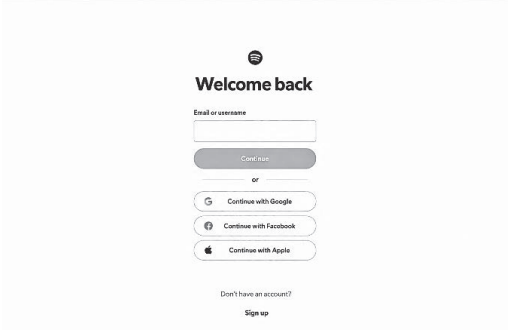

Figure 7: EduCraft's Spotify Authentication (Third Party)

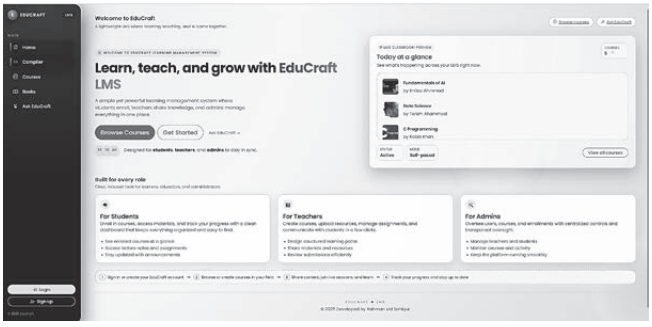

Figure 8: EduCraft's Main User Interface

Figure 9: EduCraft's Multi-Programming Languages' Compiler

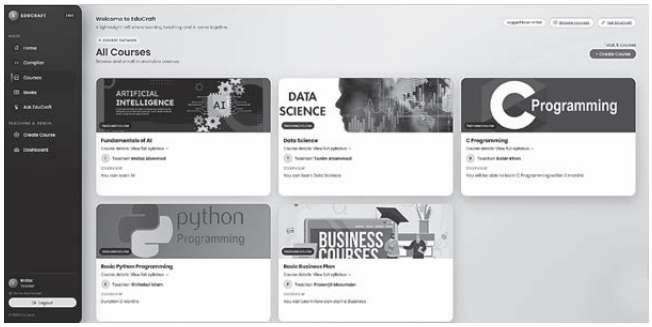

Figure 10: EduCraft's Multiple Learning Course Creation

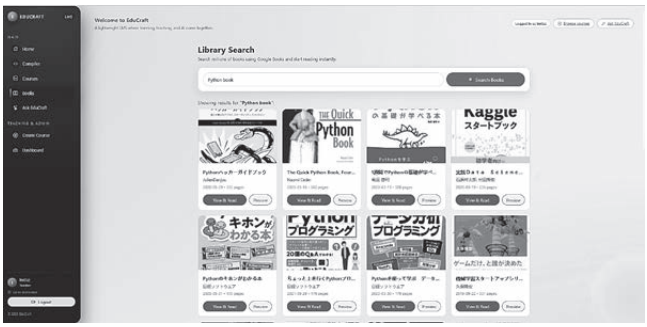

Figure 11: EduCraft's Online Library

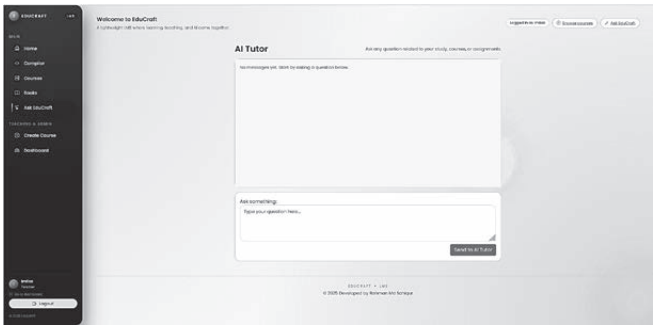

Figure 12: EduCraft's AI Tutor

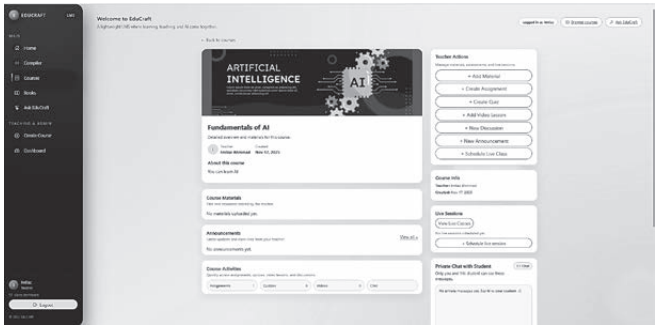

Figure 13: EduCraft's Dashboard ¦ Activity of Teacher

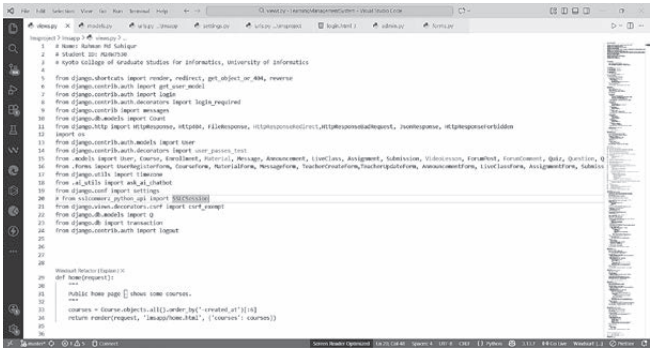

Figure 14: EduCraft's Python Coding Views

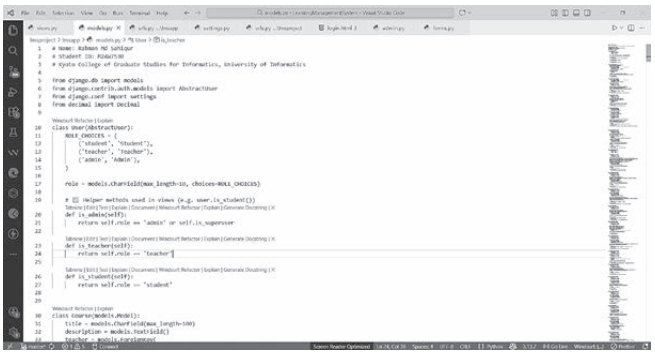

Figure 15: EduCraft's User Roles and Course Models

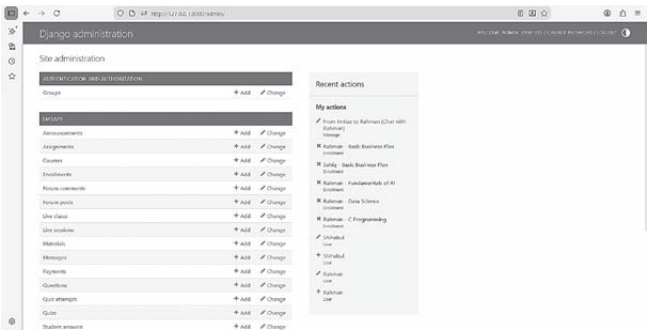

Figure 16: Glimpse of EduCraft's Admin Management