Design and Development of Online Teaching Platforms for University Art Majors in the Context of the Internet+

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Abstract. This article explores how to design and develop an online teaching platform for university art majors in the context of Internet+. The content includes: platform functionality design, resource construction, positioning of teacher-student roles, realization of teaching interaction, and methods of learning evaluation. The research shows that a carefully designed online teaching platform can enhance students' interest in learning, provide personalized learning resources, improve interactive communication, and achieve procedural evaluation. However, further improvements are needed in terms of platform security and scalability.

Keywords: Online teaching platform; Art major; Teaching model; Teaching resources; Learning evaluation.

1 Introduction

Due to the rapid development of information technology, "Internet Plus" has profoundly impacted various industries[1]. Higher education has also attempted and innovated online teaching under this trend. For art institutions, online teaching platforms provide a new opportunity for educational reform. Through these platforms, art schools can break geographical limitations and offer learning opportunities to more creative students[2]. At the same time, online platforms can diversify teaching methods, such as video courses, virtual demonstrations, remote guidance, etc., helping students build learning paths tailored to their needs and stimulate their creativity.

Online education for art majors also faces certain challenges. Art education emphasizes teacher-student interaction and hands-on practice, and creating an interactive atmosphere and providing practical conditions in an online environment is a challenge. Artistic creation requires the stimulation of inspiration and emotional experience[3]. How online teaching can offer students an immersive learning experience also needs exploration. Based on the above issues, this study aims to design an online teaching platform for a fine arts major in a university. While maintaining the quality of professional teaching, it seeks to harness the advantages of online education, enrich teaching methods, and expand learning resources, hoping to provide some reference for the development of art education.

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2 Scheme Design

2.1 Platform Functionality Design

User Management: The platform should provide a comprehensive user management fun ction to support the creation and management of teacher and student accounts[4]. By se tting different permission levels, ensure that teachers and students can operate accordin g to their roles, while also protecting platform security and data integrity.

Course Management: Teachers should be able to easily upload, delete, and edit course information. This includes basic course details like course name, description, and timet able, as well as related teaching resources, such as instructional videos, handouts, and reference materials.

Online Assessment & Feedback: The platform should offer online testing, assignment s ubmission, and real-time feedback functionalities. Teachers can create online exams and assignments; students can complete and submit them online, while teachers can grade online and provide feedback, helping students understand their learning progress and pe rformance.

Resource Sharing: The platform should allow teachers and students to upload, downloa d, and share various teaching resources[5]. This includes not only documents and videos but also resources unique to art majors, such as design templates and artwork.

Communication & Collaboration: By providing forums and real-time chat features, the platform can foster communication and collaboration between teachers and students. Fo rums can be used for asynchronous discussions, while real-time chat can support instan taneous communication and problem-solving, thereby enhancing the interactivity and eff ectiveness of teaching. The specific scheme design is shown in Figure 1.

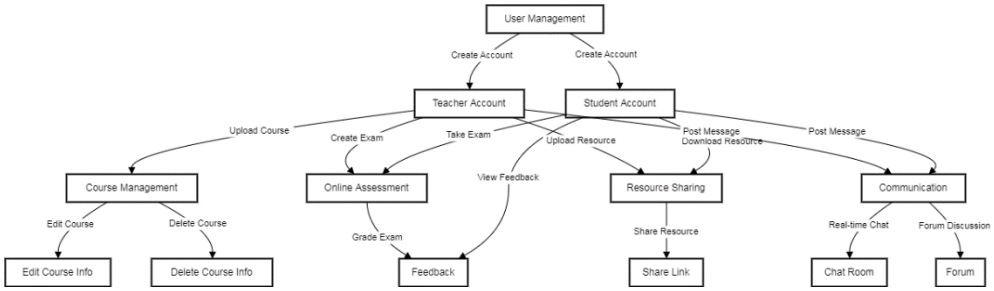

Figure 1: Schematic Design

2.2 Educational Resource Construction

Content resources: To ensure high-quality online teaching, a rich collection of instructional videos, lectures, and a showcase of exemplary works should be created. Instructional videos can provide students with a tangible learning experience by demonstrating technical operations or the artistic creation process. Lectures can include essential theoretical knowledge and operational guidelines, while the showcase of exemplary works can display excellent artistic

pieces to inspire students' creativity and interest in learning. Technical resources: Technology is a crucial support for art education. The platform should provide technical resources, including drawing tools and design software, to support students' creative practice. Through the online platform, students can directly access and use these tools without additional installation or configuration.

2.3 Positioning of Teacher and Student Roles

Teacher's role: In the online teaching platform, teachers play a central role in course design, teaching implementation, and student evaluation. They are responsible for constructing the course framework, setting teaching objectives, preparing teaching materials, and conducting teaching activities through the platform. Student's role: Students are the primary users of the online teaching platform. They are responsible for autonomous learning, communication, and self-assessment. Through the platform, students can access teaching resources, participate in course activities, interact with teachers and other students, and self-assess their learning progress and performance.

2.4 Implementation of Teaching Interaction

Synchronous interaction: The platform can realize synchronous interaction through real-time video teaching and live discussions. Teachers can convey instructional content instantly, answer students' queries, and students can immediately provide feedback on their understanding, interact in real-time with teachers and peers, creating a conducive interactive learning atmosphere. Asynchronous interaction: Asynchronous interaction is mainly achieved through forum discussions and homework submissions. Students can post their views and queries on the forum, and teachers and peers can respond when time permits. The homework submission feature allows students to submit after completing their tasks. Teachers can then evaluate and provide feedback at a suitable time, ensuring teaching quality and students' learning progress.

2.5 Learning Evaluation Methods

Formative assessment: Formative assessment mainly includes periodic tests and homework evaluations. Through these methods, teachers can understand students' learning outcomes and grasp the level. At the same time, they can provide clear feedback to students, helping them comprehend their learning progress. Process assessment: Process assessment is conducted by continuously tracking students' online participation and interaction quality. By analyzing students' performance in forum discussions, group collaboration, and other interactive activities, teachers can understand students' learning attitude and collaborative capabilities, thereby providing them with more personalized guidance and support.

3 Development and Implementation

3.1 Choice of Technical Framework

Front-end technology: The platform's front end is built using the React framework, offering a fast, flexible, and user-friendly interface. React's component-based design makes development and maintenance simpler and more efficient. Back-end technology: The backend services choose the Python Django framework, an advanced, highly reusable open-source framework. It

can quickly build secure and maintainable web applications and also simplifies database operations and management. Database technology: MySQL is chosen for database technology. It is a relational database management system with excellent stability, reliability, and efficiency. It can effectively support the storage and query of large amounts of data, meeting the platform's data processing requirements.

3.2 Principles of Interface Design

User-friendly: Interface design should be straightforward, allowing users to navigate and use the platform easily. With intuitive layouts and clear indications, reduce users' learning costs and enhance their satisfaction. Aesthetics: Given the characteristics of the art major, the interface design should be artistic and creative. By using eye-catching color combinations, elegant fonts, and innovative graphic elements, build an interface that is both beautiful and creative, providing users with a pleasant visual experience and inspiring their creative inspiration.

3.3 Resource Development and Production

Multimedia resource production: Producing high-quality instructional videos, animations, and image resources is crucial. They can present teaching content in a vivid and tangible way. Software like Adobe Premiere or After Effects can be used to produce instructional videos and animations.

Preparation of Teaching Materials: Preparing lesson plans, exercises, and other teaching materials is fundamental to ensuring the quality of teaching. The lesson plan should detail the teaching objectives and methods, while exercises should cover the main knowledge points of the course. LaTeX can be used to write lesson plans and exercises to ensure the documents have a professional appearance and format. The specific content is shown in Figure 2.

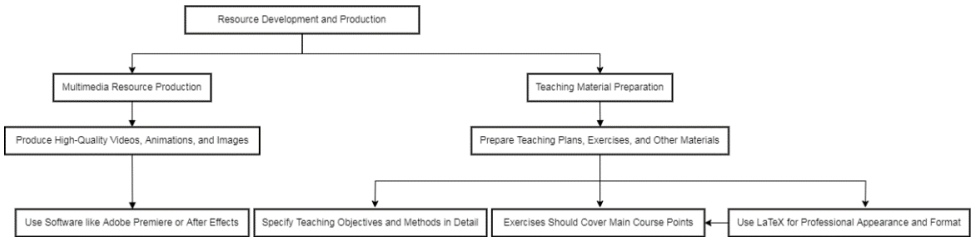

Figure 2: Resource Development Production Diagram

3.4 Development of Functional Modules

User Management: Create a user database table, implement user registration, login, and permission control features.

Course Management: Develop course database tables and related CRUD (Create, Read, Update, Delete) operation interfaces.

Online Assessment: Build an online testing and homework submission system, including grading and feedback features.

Resource Sharing: Design features for resource upload, download, and sharing, ensuring the usability and security of resources.

Communication and Collaboration: Develop forum and real-time chat features to promote interaction and collaboration among users, enhancing teaching interaction and learning outcomes. As shown in Figure 3:

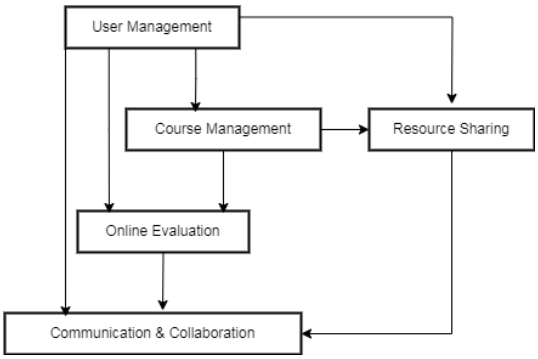

Figure 3: Functional Module Development Diagram

3.5 Testing and Optimization

Functional Testing: The purpose of functional testing is to ensure that all developed modules work correctly. By writing and executing test cases, we can verify the correctness of each function.

User Experience Testing: User experience testing evaluates the platform's usability and satisfaction levels by collecting user feedback. We can gather user feedback through surveys, interviews, or using data analysis tools, and then optimize the interface and features based on this feedback.

Through these two testing phases, we can ensure the platform's functionality is comprehensive and optimize the user experience, preparing it for the final launch. As shown in Figure 4:

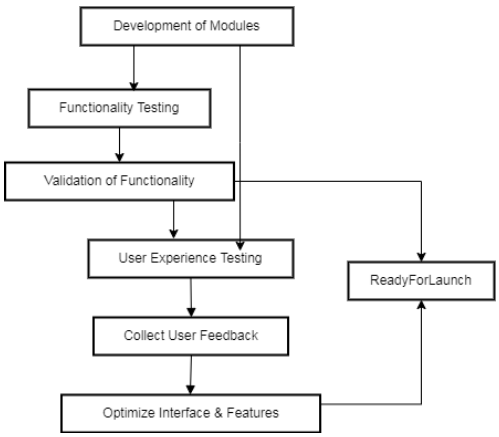

Figure 4: Test Optimization Diagram

4 Application Evaluation

4.1 Evaluation Indicator System

User Satisfaction: User satisfaction is a key metric for measuring the success of the platform. We can collect data on user satisfaction with the platform's interface, features, and overall experience through online surveys.

Learning Outcomes: Learning outcomes can be assessed by students' academic performance and their progress. Comparing students' exam scores before and after using the platform can provide a direct understanding of the platform's impact on learning. Details are shown in Table 1.

Table 1: Evaluation Indicator System

Student Name	Score Before Use	Score After Use	Progress
A	75	85	+10
B	80	88	+8
C	82	90	+8

From these evaluation data, we can draw preliminary conclusions about the platform's effectiveness and make further optimizations and improvements based on this information.

4.2 Analysis from User Surveys

To gain a deeper understanding of the users' experience and opinions on the platform, we conducted questionnaires and interviews. We primarily focused on users' overall satisfaction with the platform, their evaluation of specific features, and their suggestions for platform improvements. Table 2 presents a summary of the questionnaire survey data.

Table 2: Summary of Survey Data

Feature/Item	Very Satisfied	Satisfied	Neutral	Unsatisfied
Overall Platform Experience	50%	40%	8%	2%
Course Management Feature	48%	42%	7%	3%
Online Assessment Feature	52%	38%	8%	2%
Resource Sharing Feature	46%	44%	7%	3%
Communication & Collaboration Feature	50%	40%	6%	4%

Summary of Suggestions and Feedback: Enhance the resource search functionality, improve the platform's response speed, and add more instructional resources. Through these survey data, we can more accurately understand the users' needs and expectations, providing a strong guide for subsequent optimizations and upgrades.

4.3 Effectiveness Evaluation

The effectiveness evaluation of the online teaching platform is accomplished by analyzing the platform's impact on improving teaching quality and student learning outcomes. Table 3 displays the teaching effectiveness evaluation data:

Table 3: Effectiveness Evaluation

Metric	Item	Before Platform Use	After Platform Use	Percentage Increase
Teaching Quality	Teaching Satisfaction	75%	85%	+10%
Student Learning Outcomes	Course Completion Rate	70%	88%	+18%
	Average Exam Score	76	84	+8
	Homework Submission & Pass Rate	70%	90%	+20%
	Student Interaction Frequency	50 times/week	80 times/week	+30 times/week

From the table above, we can see that after using the online teaching platform, there is a significant improvement in teaching satisfaction, course completion rates, students' exam scores, and rates of homework submission and passing. At the same time, the frequency of student interactions has also notably increased, showing that the online teaching platform has a positive role in enhancing teaching quality and student learning outcomes.

5 Conclusion and Outlook

This study presents the design and implementation of an online teaching platform for a college fine arts major. Preliminary application evaluations show that the platform can enhance teaching efficiency, boost students' learning interest, and provide abundant learning resources. However, the platform's security and scalability still need further refinement. In the future, we plan to continue optimizing the platform's functions, enhance its security and scalability, to better serve teachers and students.

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