

Construction and Application of Aesthetic Education Auxiliary Teaching System in Universities under Web Technology

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Abstract. This study addresses the demand for informatization construction in the process of aesthetic education teaching in universities. Using the JavaEE architecture and related frameworks, a mobile terminal-supported aesthetic education auxiliary teaching system was designed and implemented. The system comprises three major modules: theoretical learning, course resources, and teacher-student interaction. Through a combination of rich video courses, literature materials, teaching courseware, and mobile interaction, an online and offline combined aesthetic teaching model has been constructed. The system has been successfully applied in several art and design majors, with comprehensive informatization of the teaching process, high student satisfaction, and a significant improvement in aesthetic literacy test scores. The research indicates that this system can effectively promote the informatization construction of aesthetic education, enhancing the quality and outcomes of teaching.

Keywords: Aesthetic education teaching; Informatization construction; Teaching system; Mobile learning

1. Introduction

With the continuous expansion of higher education in China and the basic popularization of compulsory education, the country's emphasis on aesthetic education for adolescents and improving overall aesthetic literacy has been significantly strengthened. However, the current aesthetic education in universities still faces issues such as a single curriculum, overly theoretical teaching content, traditional teaching methods, and insufficient teacher-student interaction. These problems result in suboptimal aesthetic education outcomes, making it challenging to effectively enhance students' aesthetic consciousness, taste, and creative skills. Therefore, developing a specialized aesthetic teaching system, constructing an integrated online and offline teaching model, and modernizing teaching content, methods, resources, and modes is crucial for advancing the reform of aesthetic education in universities and improving the quality and effects of aesthetic work^[1].

2. Overall System Design

2.1 Technical Framework

The system adopts the Java EE architecture and selects open-source frameworks such as Spring, SpringMVC, and Mybatis. Spring MVC achieves decoupling of the presentation layer^[2]. The IoC and AOP mechanisms of the Spring framework decouple and modularize the program. The Mybatis framework maps interface methods to SQL statements, encapsulating the data access layer. The system also employs the Bootstrap page framework, jQuery interaction framework, Tomcat application server, and MySQL database technologies^[3]. This mature technical solution, through decoupling and modular programming, enhances the system's maintainability and scalability, meeting functional and performance requirements. The specific technical architecture is shown in Figure 1.

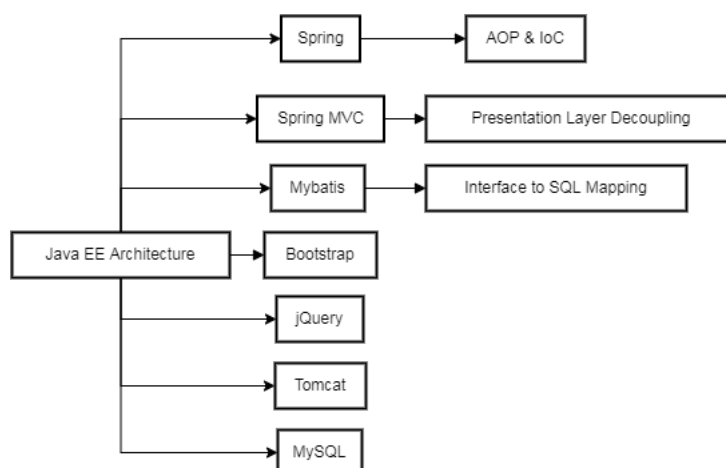


Figure 1: Technical Architecture Diagram

2.2 Functional Design

The functional module design of the system primarily includes the Aesthetic Theory Learning module, Aesthetic Course Resource module, and Teacher-Student Interaction module^[4].

Aesthetic Theory Learning Module: This module integrates video courses and literature materials. Students can study aesthetic theoretical knowledge through the video course system and gain a deeper understanding by reading classic literature materials.

Aesthetic Course Resource Module: This module offers abundant material support. Teachers can access teaching resources like courseware, teaching plans, and video courses to assist in teaching. Students can also learn from these resources and obtain more learning materials^[5].

Teacher-Student Interaction Module: This module supports real-time interaction on mobile terminals. Teachers can pose questions in class, and students can participate in answering them in real-time through mobile devices. Assignments can be submitted online, and teachers can grade them online as well. The system also provides an online discussion forum to support continuous interaction^[6].

By abstracting and extracting the main requirements, the design of these three major modules not only maintains professional specificity but also ensures the system's scalability. The modules are highly cohesive and loosely coupled, which benefits the system's maintainability. The detailed functional design is shown in Figure 2.

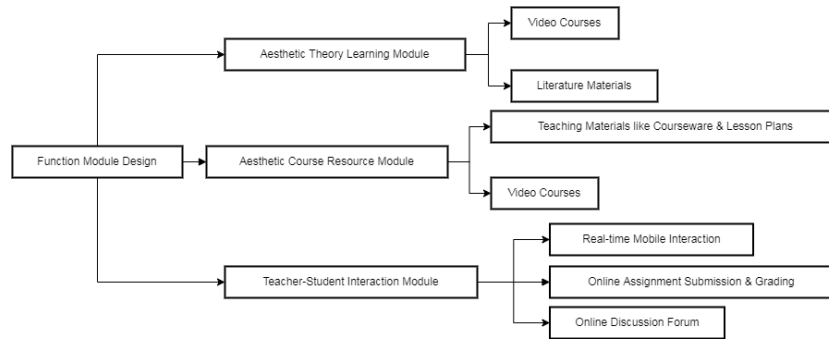


Figure 2: Functional Design Diagram

3. System Function Details

3.1 Aesthetic Theory Learning Module

The Aesthetic Theory Learning Module, through a combination of video courses and classic literature materials, assists students in systematically studying aesthetic theoretical knowledge^[7]. Video courses adopt a short video format, with each video primarily discussing one knowledge point. The duration of each video is controlled at around 10 minutes to enhance focus during learning. The videos utilize scenario-based teaching, emphasize case analysis, and strengthen the coherence of the theory. Classic literature materials are chosen from representative treatises and are organized in the form of collections. These collections are arranged by theme, with each piece of literature accompanied by introductory reading materials. After watching the videos, students can further read the related literature to expand and deepen their understanding of the knowledge points^[8]. While the video courses provide systematic organization, the literature materials enhance depth. Both complement each other, helping students to fully grasp the aesthetic theory system. The design of this module is both closely aligned with learning characteristics and in line with teaching requirements. The detailed Aesthetic Theory Learning Module is shown in Figure 3.

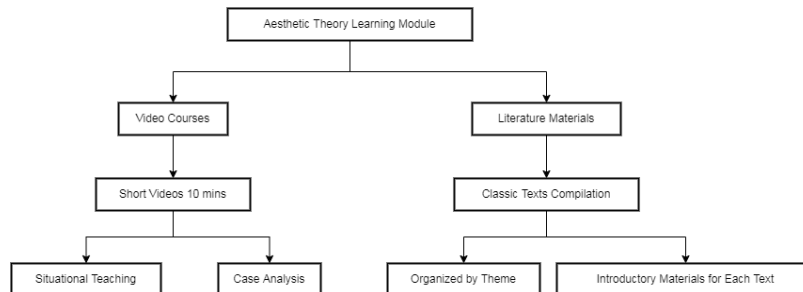


Figure 3: Aesthetic Theory Learning Module Diagram

3.2 Aesthetic Course Resource Module

The Aesthetic Course Resource Module integrates a wealth of teaching resources, offering teachers auxiliary teaching materials such as courseware, teaching plans, and video courses^[9]. The courseware library contains standard courseware for various knowledge points. Teachers can use them directly or modify and customize them to assist in classroom teaching. The teaching plan library provides a three-dimensional array of teaching plan resources. These plans are scientifically designed based on knowledge structures, accompanied by multimedia materials, allowing teachers to quickly select suitable plans. The video courses capture the lecture processes of professional teachers, enabling educators to observe and learn standard teaching methods and presentation techniques. Students can also access these video courses for independent learning^[10]. This module's resources are rich and comprehensive, providing teachers with robust design and demonstration support, promoting the effective implementation of teaching and learning. The detailed Aesthetic Course Resources are shown in Figure 4.

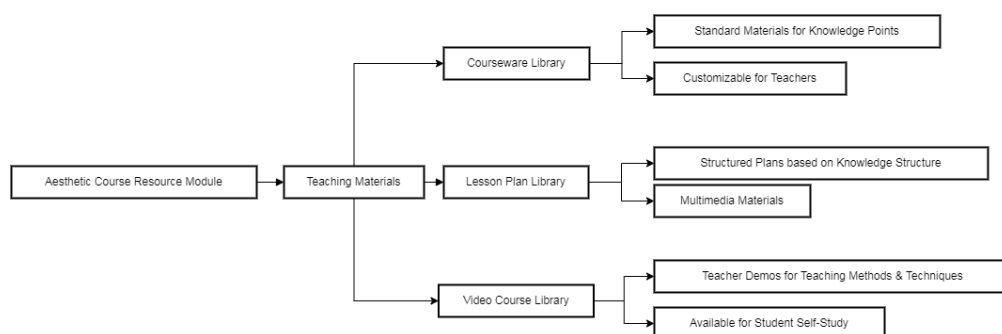


Figure 4: Aesthetic Course Resource Module Diagram

3.3 Teacher-Student Interaction Module

The Teacher-Student Interaction Module supports real-time interaction on mobile terminals, achieving seamless integration of classroom activities, assignments, and discussion forums. Teachers can pose questions in class through a mobile app, and students can instantly participate in answering using their own mobile devices, realizing genuine classroom interaction. Assignments and exercises can be submitted online through the mobile platform ASSIGN, and teachers can grade and comment on them online, achieving an informatized management process. Furthermore, the system has established an online discussion forum with clearly differentiated topics. Teachers can post discussion topics, and students can engage in group interactions, with educators providing guidance. This module fully leverages mobile network technology, supporting boundary-less interactions between teachers and students in terms of time and space, breaking down informational barriers in teaching processes, and promoting improved teaching outcomes. The detailed Teacher-Student Interaction Module is shown in Figure 5.

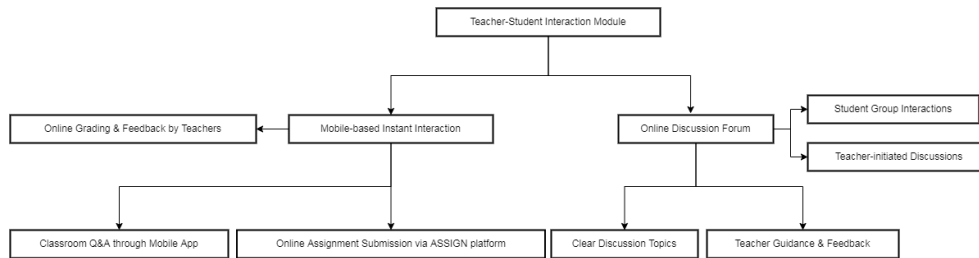


Figure 5: Teacher-Student Interaction Module Diagram

4. System Application and Effect Evaluation

4.1 Application Status

The system has been successfully applied in our school for over a year, covering 20 related majors in the fields of art and design, directly benefiting more than 20,000 students. The system usage statistics are shown in Table 1 below:

Table 1: Application Status Table

Usage Metric	Data
Number of Participating Teachers	Over 300 teachers use the system for teaching
Video Course Learning	Total video playback duration reaches 2,000 hours, with each student watching over 10 video courses on average
Mobile App Activity Rate	60% of students participate in learning and communication through the mobile app, with active users exceeding 12,000
Assignment Submission Volume	Total submissions of various assignments exceed 100,000, with each student submitting an average of 5 assignments
Teaching Plan Download Volume	Total downloads of teaching plans exceed 50,000, primarily focused on majors like painting and design

More comprehensive metrics indicate that the system plays a pivotal role in enhancing teaching quality, enriching teaching resources, and stimulating interest in learning. The high completion rate across various metrics fully demonstrates the efficient application of the system. The system will continue to be optimized and enhanced to benefit more educational users.

4.2 Effect Evaluation

To assess the effects of the system's application, a combination of questionnaire surveys and aesthetic literacy tests was specifically employed. This provided a comprehensive evaluation from both students' subjective feelings and objective abilities. Partial results are shown in Table 2 below:

Table 2: Effect Evaluation Table

Evaluation Content	Main Results
Student Satisfaction	85% of students expressed satisfaction with the system's application
Mastery of Theoretical Knowledge	Average test scores increased by 15% after the video courses
Aesthetic Ability	Average scores on the aesthetic literacy test increased by 12%
Creative Skills	Scores for professional course creations increased by 10%

The survey and test results indicate that the application of the system has significantly improved students' learning of aesthetic theoretical knowledge and their aesthetic practical abilities. The high satisfaction rate of 85% also demonstrates students' appreciation for this learning approach. In summary, the system has played a vital role in sparking learning interest and strengthening skill training. This digital, personalized teaching model is worth further promotion. We will continue to optimize the system and expand its scope of application to enhance aesthetic literacy better.

5. Conclusion and Outlook

The research has designed and developed an auxiliary teaching system for aesthetic courses in universities. By constructing modules including video courses, literature materials, teaching courseware, and mobile teaching interactions, it has successfully informatized and diversified the aesthetic teaching process. The system has been pilot-tested in several universities, significantly enriching teaching resources, modernizing teaching methods, and enhancing interactions between teachers and students. The application effect survey shows that after using the system, students have a more solid grasp of aesthetic theoretical knowledge, apparent improvements in aesthetic abilities and artistic practical skills, and increased learning interest and subjective satisfaction. The research proves that the system can effectively promote the informatization construction of aesthetic education, optimize the teaching process, and improve teaching quality and outcomes. The next steps will further enrich system tools and resources, expand the system's scope of application, and continuously promote the rapid development of aesthetic education in universities.

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