Academic Journal of Education
ISSN: 3080-9940 (Print), ISSN: 3080-9959 (Online) | Vol. 3, No. 2, 2026

Digital Empowerment in the Digital Management of Learning Processes in College Music Aesthetic Education Courses

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Abstract: In the new era, aesthetic education in colleges and universities emphasizes whole-process and all-round education. Traditional music aesthetic education classrooms commonly suffer from scattered learning records, extensive process management, delayed learning-condition tracking, and difficulty in implementing process-based evaluation, which restricts the standardized and refined development of aesthetic education teaching. To address the shortcomings in process management in aesthetic education classrooms, this study relies on digital technology to build a learning record management system for college students' music aesthetic education classrooms, realizing integrated digital management of classroom attendance, task submission, performance records, learning-condition archiving, data analysis, and process evaluation. Combining the requirements of aesthetic education reform in colleges and universities in the new era, this paper analyzes the pain points of traditional aesthetic education classroom management, elaborates on the system's design philosophy, architecture and functions, and application model, and explores the implementation path and practical value of digital empowerment in aesthetic education process management. Practice has shown that the digital learning record management system can standardize the entire process of aesthetic education teaching, accurately record students' dynamic classroom learning, improve the process-based evaluation system, and make aesthetic education teaching quantifiable, traceable, and analyzable, effectively enhancing the educational quality and teaching management level of college music aesthetic education.

Keywords: Digital Empowerment; College Aesthetic Education; Music Aesthetic Education; Process Management; Digital Teaching.

1. Introduction

1.1. Research Background

With the in-depth implementation of the modernization and digitalization strategy of education in the new era, college aesthetic education is undergoing a comprehensive transformation from "emphasizing results" to "emphasizing process, literacy, and education"[1]. As the core content of college aesthetic education, music aesthetic education is an important carrier for enhancing college students' aesthetic literacy, humanistic literacy, and comprehensive qualities. At present, public courses in college music aesthetic education cover a wide range, involve a large number of students, and have large class sizes. Traditional teaching management models rely on manual records and paper ledgers, and suffer from many problems such as non-standard records, incomplete data, difficulty in grasping learning conditions, and non-objective evaluation.

Process-oriented education is the core characteristic of aesthetic education. Students' classroom participation, learning attitude, practical performance, and artistic experience are the key bases for aesthetic education evaluation. Aesthetic education differs from knowledge-based subject teaching in that literacy such as aesthetic perception, artistic expression, and cultural understanding cannot be measured solely by final examinations; rather, they are embedded in diverse scenarios such as classroom listening, singing performances, group appreciation discussions, and extracurricular artistic practice. Traditional extensive management cannot fully preserve students' aesthetic education learning trajectories, making it difficult to achieve precise education and scientific evaluation. With the continuous advancement of the education digitalization strategy, various digital teaching tools are constantly entering college classrooms, providing technical conditions for the innovation of aesthetic education management models. Therefore, reforming the aesthetic education classroom management model through digital empowerment and building a systematic, digital, and standardized learning process management system has become an inevitable trend for improving the quality and efficiency of college aesthetic education.

1.2. Research Significance

At the theoretical level, based on the concepts of education digitalization and whole-process aesthetic education, this study explores the deep integration path of digital technology and college music aesthetic education management, improves the theoretical system of digital aesthetic education management, and enriches the research content of college aesthetic education in the new era. Existing aesthetic education research focuses more on course content and teaching methods, while theoretical discussion on the digitalization of process management is relatively weak. This study can provide theoretical reference for subsequent similar research.

At the practical level, by building a digital learning record management system, this study achieves whole-process data preservation, dynamic monitoring of learning conditions, and scientific and standardized evaluation in aesthetic education classrooms, effectively solving the problems of loose management, single evaluation, and missing processes in traditional aesthetic education, helping colleges and universities achieve refined, standardized, and intelligent

management of aesthetic education teaching, and comprehensively enhancing the effectiveness of aesthetic education. At the same time, it also provides a referable practical paradigm for the process management reform of other art public courses.

1.3. Research Status

At present, domestic research on college aesthetic education mostly focuses on curriculum design, teaching methods, and aesthetic education penetration, while specialized research on the digital management of classroom learning processes is relatively scarce. Most college aesthetic education classrooms still adopt the model of manual roll call, paper registration, and one-time final assessment, with serious deficiencies in process data, which cannot meet the requirements of aesthetic education evaluation reform in the new era[2]. With the advancement of education digitalization, digital management has gradually been applied to teaching scenarios, but there are still obvious shortcomings in its professional and systematic application in aesthetic education classrooms. Chen Ming proposed that education digitalization should promote classroom management from empirical judgment to data-driven, but related practices are mostly applied to science and engineering courses and liberal arts theoretical courses, while customized management platform construction for experience- and practice-oriented courses such as music aesthetic education remains insufficient[3]. Zhao Yu pointed out that the digitalization of music aesthetic education mostly concentrates on resource platform construction, with insufficient attention to learning process tracking and management, which leaves considerable research and practice space for this study[4].

1.4. Research Methods

This study adopts literature research method, system design method, teaching practice method, and comparative analysis method. It sorts out policies and research results related to aesthetic education digitalization and process-based evaluation, and designs system functions based on the characteristics of aesthetic education classroom teaching; selects multiple classes of public music aesthetic education courses at the author's university to carry out one-semester teaching practice, and tests the application effect through real teaching data collected by the platform; compares the educational differences between traditional management mode and digital management mode in dimensions such as student classroom participation, evaluation fairness, and teacher workload, and summarizes optimization paths.

2. Related Concepts and Theoretical Basis

2.1. Core Concepts

Digital empowerment of aesthetic education refers to using digital technology to reconstruct the teaching process, management model, and evaluation system of aesthetic education, promoting the quality improvement and upgrading of aesthetic education teaching. Digital empowerment is not simply migrating offline content online; rather, it uses data collection, storage, and analysis capabilities to connect pre-class, in-class, and post-class teaching links, transforming implicit aesthetic learning behaviors into recordable explicit data. Process management of music aesthetic education classrooms refers to the dynamic management of the entire process of students' classroom participation, learning performance, task completion, and artistic practice. Process-based evaluation emphasizes carrying out diverse, objective, and developmental evaluation based on the entire learning process, abandoning single summative assessment, and valuing the gradual generation and development of students' literacy[2].

2.2. Theoretical Basis

Developmental evaluation theory advocates promoting students' comprehensive development through whole-process and multi-dimensional evaluation, which conforms to the law of aesthetic education literacy cultivation. The purpose of evaluation is not to distinguish superiority from inferiority, but to discover the possibilities of students' aesthetic growth. Educational digital governance theory emphasizes achieving standardized, precise, and efficient teaching management through digital means, promoting teaching governance from manual governance to data governance[3]. Multiple intelligences theory proves that students' artistic literacy has differentiated development characteristics; different students have different abilities in music perception, singing performance, and appreciation thinking, requiring whole-process dynamic tracking and personalized cultivation rather than using a unified standardized yardstick to measure all students.

2.3. Shortcomings of Traditional Aesthetic Education Classroom Management

First, process records are fragmented, with many omissions in manual records and difficulty in preservation. In large classes, teachers have limited energy and find it difficult to completely record every student's classroom presentation and speech; paper records are easily lost and difficult to preserve for a long time. Second, learning-condition feedback lags; teachers cannot grasp students' learning status in real time and can only rely on subjective impressions to judge students' learning situations. Third, the evaluation system is single, emphasizing the final examination and neglecting the process; final grades largely depend on subjective impressions or simple assignments, making it difficult to reflect changes in students' aesthetic abilities throughout the semester[2]. Fourth, teaching archives are non-standard, and aesthetic education outcomes are difficult to present quantitatively; schools lack complete and verifiable process materials when conducting aesthetic education quality assessments. In addition, under the traditional model, teachers must simultaneously complete multiple tasks such as attendance registration, performance recording, and assignment archiving, which occupies time for teaching design and classroom appreciation guidance, indirectly reducing the quality of aesthetic education classroom teaching.

3. Design of the Learning Record Management System for College Students' Music Aesthetic Education Classrooms

3.1. Construction Goals

With the goals of standardizing the aesthetic education teaching process, improving process-based evaluation, accurately grasping learning conditions, and enhancing the quality and efficiency of aesthetic education management, a

full-coverage, traceable, analyzable, and evaluable digital management platform for aesthetic education classrooms is built. Based on the reality of large-class teaching in public music aesthetic education in colleges and universities, the platform takes into account both practicality and the disciplinary particularity of aesthetic education, does not pursue excessive complex technology stacking, focuses on solving real pain points in teaching management, and serves the core educational goal of cultivating aesthetic literacy[4].

3.2. Design Principles

Adhere to the principle of standardization, conforming to the norms of college aesthetic education teaching management and aligning with the requirements of relevant documents on aesthetic education reform of the Ministry of Education[1]; adhere to the principle of practicality, adapting to large-class teaching and daily teaching scenarios and lowering the operational threshold for teachers and students; adhere to the principle of whole process, covering the entire process before, during, and after class; adhere to the principle of dataization, achieving accurate preservation and statistics of learning behavior data; at the same time, take into account the humanistic principle—the system is only a management tool, and excessive dataization should be avoided from dissolving the aesthetic experience core of music aesthetic education.

3.3. Overall System Architecture

The system is divided into a teacher management terminal and a student learning terminal, containing six core modules: intelligent classroom sign-in module, classroom performance recording module, learning task submission module, electronic growth archive module, learning-condition data analysis module, and process evaluation management module. The teacher terminal focuses on data entry, grading, statistical analysis, and evaluation settings; the student terminal focuses on task reception, sign-in check-in, achievement upload, and viewing personal aesthetic education growth archives.

3.4. Core Function Introduction

Intelligent sign-in realizes rapid attendance, automatic statistics, and retention of absence records, and supports multiple sign-in methods to adapt to different classroom scenarios; the classroom performance recording module records students' speeches, singing presentations, and classroom interactions, and teachers can mark brief evaluations of students' performances and appreciation speeches; the task submission module supports online submission and archiving of aesthetic education assignments, reflections, and practical works, and is compatible with various artistic achievement formats such as text, audio, and video; the electronic growth archive automatically summarizes students' aesthetic education learning data for the entire semester, completely preserving students' assignments, performance records, and teacher comments; the data analysis module generates class learning-condition reports and individual learning reports, intuitively displaying the overall participation of the class and each student's learning trajectory; the process evaluation module sets weights for various indicators based on whole-process data, automatically generating scientific comprehensive scores by combining classroom performance and assignment practice data, while teachers retain the authority for manual fine-tuning, balancing data objectivity and the humanistic nature of aesthetic education[2].

4. Application Practice of the System in Music Aesthetic Education Classrooms

4.1. Pre-class Management

Teachers publish course previews, learning tasks, and preview content through the system, push music appreciation materials and short video learning resources, and students receive learning requirements in advance, make pre-class preparations, and cultivate independent aesthetic education learning awareness. The completion of pre-class tasks is simultaneously recorded in personal archives, extending aesthetic education learning to the pre-class stage and changing the situation where aesthetic education is limited to the 45 minutes of classroom time.

4.2. In-class Management

Relying on the system to complete intelligent attendance, record students' classroom interactions, artistic presentations, and listening status in real time, and preserve classroom learning data throughout the process, replacing traditional manual registration, improving classroom management efficiency, and achieving quantifiable classroom performance[3]. When carrying out teaching activities such as song singing and music appreciation discussions in class, teachers can quickly mark and briefly comment on student performance, and the relevant information is incorporated into students' personal archives in real time, without the need to spend a lot of time organizing paper notes after class.

4.3. Post-class Management

Students submit post-class aesthetic education assignments, artistic reflections, and practical achievements online, and the system automatically archives them into personal aesthetic education growth archives. Teachers grade and provide feedback online, dynamically track students' learning progress, and accurately identify learning shortcomings. Teachers can use platform data to provide targeted guidance to students with low participation and weak quality in artistic reflection assignments, achieving teaching according to aptitude.

4.4. Final Comprehensive Evaluation

At the end of the term, relying on whole-process data from the system, comprehensive evaluation is conducted in combination with classroom performance, task completion, practical achievements, and learning attitude, completely changing the single evaluation model of "one exam determines the grade" and achieving scientific and fair aesthetic education evaluation[2]. Evaluation no longer relies solely on a final report or a single singing performance; the aesthetic learning process of the entire semester becomes an important component of the grade, implementing the reform orientation of process-based aesthetic education evaluation in the new era[1].

5. Application Effects and Optimization Countermeasures

5.1. Application Effects

The digital management system has completely revolutionized the traditional extensive management model

of aesthetic education, achieving standardized management, transparent processes, and visualized data in music aesthetic education classrooms. Students' classroom participation enthusiasm has significantly increased, and many students are more willing to actively participate in classroom singing and appreciation sharing. The aesthetic education learning process has been completely recorded, and personal artistic growth trajectories are clearly traceable. Teachers can accurately grasp learning conditions, reduce repetitive tasks such as paper ledger organization, devote more energy to teaching design and aesthetic guidance, and carry out targeted teaching guidance. The process-based evaluation system has been further improved, effectively implementing the whole-process educational requirements of aesthetic education[1], and significantly enhancing the teaching quality and management level of college music aesthetic education. At the same time, complete process archive materials also provide reliable data support for school aesthetic education self-inspection and quality assessment.

5.2. Existing Problems

Some students lack proficiency in digital use, and a small number of students are not skilled in operating the platform to upload audio and video artistic works, affecting the efficiency of assignment submission; the system's in-depth data analysis and educational guidance functions need to be expanded, and currently remain more at the level of data statistical summarization, with limited intelligent analysis capability oriented to the dimension of students' aesthetic literacy[4]; the digital recording of individual classroom practice contents still needs refinement—for collective activities such as group cooperative performances and on-site music experiences, how to accurately correspond to each student's individual performance remains a recording difficulty; in addition, it is necessary to guard against the risk of excessive dataization, preventing rich music aesthetic experiences from being simplified into cold numerical scores.

5.3. Optimization Strategies

Carry out guidance on digital learning use, briefly explain platform operations at the beginning of the course, produce simple operation guides, and improve teachers' and students' platform operation capabilities; optimize big data analysis functions, accurately match students' aesthetic education literacy shortcomings based on classroom interaction and work achievement data, and push personalized music appreciation and music learning suggestions[3]; refine the recording dimensions of modules such as artistic practice and classroom performances, add sub-item recording columns for group practice, distinguish different contributions of students in collective activities, and further improve the whole-process data system; establish the concept of tools serving education, clarify that the system is only an auxiliary management means, retain space for teachers' humanistic judgment in the evaluation process, avoid data-only thinking, and safeguard the essential aesthetic educational nature of music aesthetic education.

6. Conclusion and Outlook

Based on the background of education digitalization reform and combined with the whole-process educational needs of college music aesthetic education, this study constructs a learning record management system for college students' music aesthetic education classrooms, effectively solving prominent problems such as missing process management, single evaluation, and non-standard archives in traditional aesthetic education classrooms. Through digital means, the system achieves full-process control, full-data preservation, and all-round evaluation of aesthetic education teaching, promoting the transformation of college music aesthetic education from empirical management to data-based, refined, and scientific management, which has important practical significance for improving the quality and efficiency of college aesthetic education in the new era.

In the future, system functions will continue to be optimized, and the deep integration of digital technology with aesthetic education teaching, evaluation, and management will be deepened to continuously improve the whole-process education system. On the one hand, optimize algorithm models to mine the development characteristics of students' aesthetic literacy behind aesthetic education learning data; on the other hand, actively link various second-classroom artistic activities on campus, break down the data barriers between classroom aesthetic education and extracurricular artistic practice, incorporate extracurricular aesthetic education performances such as club performances and art lectures into the management system, give full play to the advantages of digital empowerment, continuously improve the educational quality of college aesthetic education, and help college students in the new era develop their aesthetic literacy and comprehensive qualities in an all-round way.

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