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Article

A study on the application effect of flipped classroom in undergraduate piano performance practice

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Abstract: In recent years, the flipped classroom, as a student-centered teaching model, has been widely applied in various fields of higher education, with its application in music education and piano performance teaching receiving increasing attention. Based on 13 relevant domestic and international research papers, this paper systematically analyzes their research topics, implementation strategies, and teaching effectiveness, summarizing the application characteristics and results of the flipped classroom in undergraduate piano performance practice. The study found that the flipped classroom can effectively promote students' self-directed learning, improve performance skills, and enhance classroom interaction in piano teaching; however, it also presents challenges in areas such as teachers' information literacy, the construction of teaching resources, and students' self-discipline. This paper aims to provide a reference for the reform of piano teaching in universities and to provide a literature basis for the future in-depth application of the flipped classroom in the field of music education.

Keywords: flipped classroom; piano performance; undergraduate education; teaching model; music education

1. Introduction

With the advancement of educational informatization and the innovation of teaching philosophies, the flipped classroom has gradually become an important direction for higher education reform. The main idea is the transformation of the conventional classroom's "transmission of knowledge" part from the traditional face-to-face class time to self-study before the class, with the class time now being used for the processing, practicing, or sharing of knowledge, according to Doung-In (2017). In music education, especially in piano performance courses, this model has significant potential (Fu, 2020). Piano performance, as a discipline that emphasizes both skill and artistry, stresses individual student practice and performance experience. Traditional teaching methods, where teachers are dominant and students are passive, struggle to meet the needs of students personalized and creative development (Lage et al., 2000). Therefore, the flipped classroom offers a new possibility for piano teaching.

Scholars both domestically and internationally have conducted multi-faceted research on the application of the flipped classroom in music education. International research primarily focuses on improving learning motivation, self-directed learning, and classroom participation (Sun et al., 2025; Palazón-Herrera & Soria-Vílchez, 2021), while domestic research pays more attention to the innovation of teaching models and the construction of information platforms (Wang, 2022; Li, 2022). However, a systematic literature review focusing on undergraduate piano performance practice is currently scarce. Therefore, this paper aims to systematically analyze existing research findings, summarize the application effects and problems of the flipped classroom in undergraduate piano performance practice, and provide theoretical and practical references for the reform of music education in higher education institutions.

2. Methods

This paper employs a literature review method, using 13 selected Chinese and foreign articles as the research foundation. The selected literature covers

representative studies from 2000 to 2025, including both theoretical origins and model analysis of the flipped classroom (Doung-In, 2017; Lage et al., 2000) and practical research on music education and piano courses (Fu, 2020; Wang, 2022; Zhu et al., 2025). Through a systematic review and summary of these articles, this paper aims to explore the current application status and pedagogical implications of the flipped classroom in undergraduate piano performance practice from three dimensions: theory, practice, and effectiveness evaluation.

First, in the thematic classification stage, this paper divides the literature into three main themes based on the research content and research purpose: (1) the flipped classroom teaching model and theoretical framework; (2) the practice of flipped classroom in music and piano teaching; and (3) the teaching effect and problem analysis of flipped classroom. The first type focuses on the flipped classroom's core concepts and theoretical framework. The second type examines flipped classroom practices in music education, particularly in piano performance courses, revealing its innovation in arts teaching. The third type evaluates teaching effectiveness, including student motivation, participation, and skill improvement, while reflecting on existing problems and providing improvement suggestions.

In the content analysis phase, this paper compares research objectives, instructional designs, and implementation processes across studies. The analysis examines differences in instructional structure, technological tools, and role transformations. Some studies emphasize teachers' "dual facilitator" role (Bishop & Verleger, 2013), while others highlight students' self-directed learning as critical to success.

Finally, in the conclusion section, based on the results of the comparative analysis, the main application effects and improvement directions of the flipped classroom in undergraduate piano performance practice are summarized. Overall, the flipped classroom effectively promotes students' active learning and self-reflection, and improves the teaching efficiency and personalization level of piano performance courses. However, problems also exist, such as uneven distribution of teacher resources, varying levels of students' self-learning abilities, and insufficient technical support. Through systematic literature comparison and summarization, this paper further proposes considerations for future teaching improvements, including optimizing the design of pre-class learning resources, strengthening classroom interaction and feedback mechanisms, and establishing a flipped teaching model

framework adapted to the characteristics of music majors, providing theoretical and methodological references for subsequent empirical research.

3. Results

3.1. Teaching Characteristics and Theoretical Basis of the Flipped Classroom

The flipped classroom model, first proposed by Lage et al. (2000), emphasizes individualized learning and interactive activities. Doung-In (2017) developed the "pre-class self-study—in-class internalization" framework. In music teaching, students study theory and skills via videos before class, while class time focuses on performance practice and interaction (Palazón-Herrera & Soria-Vílchez, 2021).

It has been found that the flipped classroom mode is highly beneficial in developing the learning initiative and knowledge internalization capacity of the learners (Lv et al., 2023). In the context of teaching piano performance, the flipped mode turns the conventional process of "teach—practice" into "self-study—practice—reflection—presentation" (Zhu et al., 2025). The role of the teachers changes from being only the transmitters of the knowledge to the learning facilitators.

3.2. The Flipped Classroom Approach in Piano Performance Teaching

There have also been some studies conducted domestically on the application of the flipped classroom approach to piano basics and performance classes. Wang (2022) involved developing the design of the flipped classroom teaching mode for basic piano courses on MOOC platforms, concluding that the enthusiasm for pre-class learning had been improved substantially. Fu Juan's work in 2020 involved the "micro-class + flipped classroom" teaching mode, teaching students about fingering, music, and performing techniques, giving students more time to engage in one-to-one teaching, group teaching, and completing joint performances.

International research by Sun (2025) and Li (2022) explored the flipped classroom's impact on self-regulation and music performance. Sun (2025) found it significantly improved student engagement and confidence, while Li (2022) demonstrated enhanced self-feedback and planning capabilities during independent study.

Furthermore, Liu (2024) also studied the process of piano learning in the flipped classroom with the application of AI analysis technology, stating that the integration of artificial intelligence with the flipped teaching mode can accurately identify the "weak links" in the process of students' learning of performance skills, achieving the effect of personalize teaching.

3.3. Teaching Effectiveness of Flipped Classroom

A number of studies have clearly shown that the flipped-classroom approach leads to much greater effectiveness in teaching piano skills, according to Doung-In (2017), Wang (2022), and Zhu et al. (2025). This is achieved through:

(1) Increased autonomy in learning: The students are able to plan their learning process based on their own pace and also be proactive in the class learning process (Sun et al., 2025).

(2) Improved class interactions: There is more time spent on group performances, evaluations, and directions from the teacher (Palazón-Herrera & Soria-Vílchez, 2021).

(3) Enhanced learning outcomes: There are observed improvements in the learning outcomes of the students, coupled with their skills in performing on stage.

(4) Improved learning interest: Via the multi-media platforms, the positive emotions of the learners towards music are aroused (Lv et al., 2023).

3.4. Existing Problems

Although the flipped classroom has reached outstanding outcomes in teaching piano and has injected fresh vitality into the undergraduate piano performance system, many problems are still worthy of attention in the practical process of the flipped classroom application. The problems are mainly focused on the following four aspects, including the information literacy of teachers, self-discipline of students in studying, and the mechanism of constructing and evaluating teaching resources, etc.

Teachers' insufficient information literacy is a key barrier to flipped classroom implementation. Piano teachers generally excel in artistic practice but lack educational technology skills. Some cannot effectively create, edit, or manage teaching videos, resulting in poor quality content that fails to convey teaching emphasis and artistic expression (Li, 2022). Additionally, many teachers maintain traditional "classroom-centered" concepts and have not fully embraced the flipped classroom's integrated "pre-class, in-class, post-class" logic, preventing true "student-centered learning" from being realized.

Second, the differences between the students' self-discipline levels are an important element influencing the effectiveness of the flipped classroom design. Because there are differences between undergraduate students in learning behaviors, motivation, self-management capabilities, and other aspects, some students are less proactive before the class, just only watching the teaching video to fulfill the tasks in the class (Wang, 2022). This not only weakens the pre-class preparation effect of the flipped classroom but also affects the quality of interaction and the teaching process in class. Especially in art courses, piano performance requires extended periods of independent practice and reflection; if students lack intrinsic motivation, the advantages of the flipped classroom will be difficult to realize.

Third, the uneven development of teaching resources is a prominent issue. Although some universities have established digital platforms for music education courses, high-quality piano teaching videos, accompaniment materials, and interactive courseware remain scarce (Fu, 2020). Some teacher-made teaching resources lack unified standards, are fragmented, and lack systematic teaching logic and artistic coherence. Furthermore, differences in hardware conditions, technical support, and funding among different institutions also contribute to the uneven effectiveness of the flipped classroom implementation.

Finally, the evaluation mechanism is still imperfect. Most current research focuses on surveys of student satisfaction or learning attitudes, with limited quantitative assessment of the learning process and skill improvement (Liu, 2024). This lack of a scientific evaluation system makes it difficult for teachers to accurately assess students' actual learning outcomes and performance improvement in the flipped classroom. Furthermore, existing assessment methods primarily rely on final performance grades, failing to fully reflect students' comprehensive performance in pre-class learning, classroom participation, and collaborative learning. Thus, future

teaching evaluation models must be designed with multi-dimensional indicators, formative evaluations, peer ratings, or self-evaluations to ensure the well-rounded development of students.

4. Discussion

The application of the flipped classroom strategy in piano performance practices indicates the integrated level of educational informatization and teaching philosophy. In comparison with the traditional teaching mode, the superiority is the emphasis on the learner's central role, encouraging the learners to transform from "passive acceptance" to "active seeking." The revolution is consistent with the teaching principle of constructivist learning theory "learners actively constructing knowledge" (Lage et al., 2000).

To start with, from the viewpoint of learning psychology, the flipped classroom improves students' learning motivation and feelings of accomplishment by linking out-of-class learning with in-class learning (Wang, 2025). Following basic knowledge learned previously, the in-class learning turns more focused, with higher feedback on students' attainment levels. Second, from the teaching practice's view, the role switch between the lecturers and the students makes the entire teaching process more malleable and dynamic (Doung-In, S, 2017). The lecturers are able to give students feedback on their work with the help of technology, hence improving teaching efficiency.

However, according to the literature, the flipped classroom is also described as having its limitations, with effectiveness depending on the context for its application (Wang, 2022). Considering the piano performance class, the abilities of the pupils, time management, or self-discipline are some aspects that influence the effectiveness of the process of learning. According to Palazón-Herrera & Soria-Vílchez (2021), the lack of self-management in music flipped classrooms leads to poor preparation before the class, reducing the efficacy of the class.

When referring to teaching resources, local scholars typically emphasize the need to create a database on music teaching resources in order to promote the continuation of the flipped teaching mode, with Fu (2020), Li (2022), etc. However, international scholars pay greater attention to the integration of technology with teaching approaches. They include, for instance, the design developed by Liu (2024),

which seeks to combine the application of AI with the analysis of teaching effectiveness from the perspective of learning analytics.

In sum, the literature is in accordance in stating that the flipped class can, in effect, enhance the quality of piano performance practice teaching and the educational performance, but its success relies on the upgrading of teachers' professional development, resources, and learning strategies for students (Lv et al., 2023; Zhu et al., 2025).

5. Conclusion

In conclusion, the flipped classroom shows strong teaching value and innovation in undergraduate piano performance practices. Under the learning pattern of "pre-class self-study – in-class interactive practice – post-class reflection and improvement," students develop from passive learners to active learners, achieving different levels of effectiveness in their learning initiative, self-regulation strategies, and expressiveness in their performance. Relative to the traditional teaching paradigm that is centered on the teacher, the flipped classroom is more conducive to stimulating the students' learning interest and desire to express themselves, transforming the classroom from "Knowledge Transmissions" to "Ability Construction," hence assisting students' well-rounded development in the cognitive, skill, and emotional aspects (Doung-In, 2017; Wang, 2022).

Regarding the pedagogical level, the application of the flipped classroom has also brought about the development of the role of the teaching personnel itself. Teaching personnel are no longer merely "lecturers" but have become "designers" and "guides" of the process, with the design of a more diverse teaching structure enabled by teaching videos, task learning, and feedback interaction (Zheng et al., 2020). The application of the flipped classroom makes the teaching process in the classroom more focused and open, giving students greater room for independent study with the help of the platform of exchange provided, which also highlights the importance of differences between individuals, allowing the instructor to provide more particular support according to their levels of activity and abilities of comprehension, making the effectiveness and artistry of piano teaching more outstanding.

However, according to the existing literature, there are also challenges facing the development of the flipped classroom in piano teaching today. Firstly, the quality of

the teaching resources is uneven, with the teaching content delivered by each teacher having obvious differences, influencing the consistency of the quality of teaching provided to the students via the video platforms created by these teachers. The teaching technology skills of some teachers also require upgrading, making them unable to effectively develop teaching innovation with the help of information technology (Li, 2022). There is also the lack of self-discipline among students, who still often overlook the importance of the quality of teaching provided before the class, with some students still preferring class teaching, neglecting the value of pre-class teaching, due to lack of self-discipline to watch the teaching videos on their own (Fu, 2020).

Future research should address four key areas. First, develop a systematic evaluation system for multi-dimensional assessment of learning processes and outcomes. Second, integrate artificial intelligence and learning analytics to provide personalized support through intelligent recommendations and optimized learning paths. Third, establish collaborative platforms among universities to share high-quality teaching resources. Finally, explore learners' psychological behaviors in flipped teaching, incorporating musical emotional expression and creativity into instructional design to enhance the flipped classroom's artistic and humanistic dimensions.

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