

IMPROVING STUDENTS' CRITICAL THINKING ABILITY THROUGH FLIPPED CLASSROOM TEACHING METHOD: A CASE STUDY OF A MUSIC APPRECIATION COURSE IN A CHINESE VOCATIONAL COLLEGE*

Chengjie Ma¹ and Sunsern Laohasthit²

Faculty of Education, Phetchaburi Rajabhat University, Thailand

E-mail: 351580249@qq.com tell.13406722015

Abstract

This study aimed to (1) examine the effect of the flipped classroom teaching method on students' critical thinking ability in music appreciation and (2) explore students' satisfaction with the flipped classroom learning experience. A one-group pretest–posttest design was employed over a four-week instructional period with 16 total teaching hours. A total of 78 second-year vocational college students in **Shandong Province, China**, participated in flipped classroom lessons designed to promote active learning, in-depth musical analysis, and reflective thinking. Data were collected through a validated Critical Thinking Ability Test administered before and after the intervention, as well as a post-intervention satisfaction questionnaire measuring students' perceptions of course resources, in-class interaction, learning experience, and overall instructional effectiveness. The findings revealed a statistically significant improvement in students' overall critical thinking ability following the flipped classroom intervention, particularly in the dimensions of analytical ability, evaluative ability, inference ability, explanation ability, and self-regulation ability. The average score on the post-test ($\bar{x} = 33.23$, S.D.= 0.55) was significantly higher than that of the pre-test ($\bar{x} = 19.26$, S.D. = 0.67). Statistical analysis revealed that the increase in post-test scores was significant ($p < .001$). Students also reported high levels of engagement and satisfaction, frequently highlighting the interactive learning

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environment and increased opportunities for independent thinking and classroom discussion.

Keywords: Flipped Classroom; Music Appreciation; Critical Thinking Ability; Vocational Education; Learning Satisfaction

Introduction

As an important vehicle for aesthetic education in vocational colleges, music appreciation courses aim to foster students' aesthetic judgment, cultural understanding, and innovative thinking. However, these courses are still largely dominated by traditional teacher-centered lecturing, resulting in limited student engagement and insufficient development of independent thinking. As Bloom (B. S. Bloom) noted in the *Taxonomy of Educational Objectives*, such traditional approaches often remain at the levels of “remembering” and “understanding,” rarely reaching higher-order thinking skills such as analysis, evaluation, and creation. Excessive emphasis on music theory and historical background further weakens students' ability to independently interpret musical styles, emotions, and cultural meanings, which contradicts the student-centered orientation of vocational education reform.

From the perspective of critical thinking cultivation, vocational college students face two major challenges in music appreciation learning. First, the lack of systematic thinking training makes it difficult for them to analyze musical expression through elements such as melody, rhythm, and harmony. Second, the long-standing reliance on “standard answers” leads to superficial and homogeneous evaluations of musical works, hindering the formation of individualized aesthetic judgments. This situation not only limits the educational value of music appreciation courses but also fails to meet workplace demands for talents capable of independent analysis and problem-solving.

In recent years, countries such as the United States and Finland have increasingly adopted flipped classrooms to promote higher-order thinking in vocational education. By combining pre-class autonomous learning with in-class interaction, the flipped classroom shifts knowledge transmission outside the classroom and reserves class time for discussion, exploration, and practice,

thereby creating favorable conditions for critical thinking development (Bergmann & Sams, 2012). Empirical studies have confirmed its effectiveness in enhancing learners' autonomy and problem-solving abilities, particularly in art appreciation contexts that encourage multiple interpretations (Strayer, 2012).

In China, the *Guidelines for the Construction of Aesthetic Education Courses in Vocational Education* (2022) explicitly call for innovative teaching methods that actively engage students in artistic experience and critical thinking. Nevertheless, the application of flipped classrooms in vocational college music appreciation courses remains exploratory. Some practices lack effective in-class interaction design, resulting in superficial implementation, while others are constrained by concerns over teaching progress and class size (Zhao Xiaodan, 2023).

Against this backdrop, this study investigates the application of flipped classroom teaching in vocational college music appreciation courses and its role in enhancing students' critical thinking, with a focus on quantifying the improvement of specific critical thinking dimensions and verifying the practical applicability of this teaching model in Chinese vocational education contexts. The study aims to enrich flipped classroom research in art education and provide a practical, discipline-specific framework for cultivating critical thinking, offering actionable references for music teachers and supporting the integrated development of aesthetic education and core vocational competencies.

Questions

1. After using the flipped classroom teaching method, is students' critical thinking ability in music appreciation courses higher compared to before?
2. Is students' satisfaction with the use of the flipped classroom teaching method at a higher level?

Objectives

1. To explore the effectiveness of the flipped classroom teaching method on vocational college students' critical thinking ability in music appreciation courses.

2. To investigate college students' satisfaction with the flipped classroom teaching method on vocational college students' critical thinking ability in music appreciation.

Literature Review

1. Music Appreciation Courses in Higher Vocational Colleges

Music appreciation courses in higher vocational colleges are developed in accordance with the *Guidelines for the Construction of Aesthetic Education Courses in Vocational Education* (2022), with the primary aim of cultivating students' aesthetic judgment, cultural understanding, and innovative thinking. In recent years, curriculum reform has emphasized that music appreciation should extend beyond artistic enjoyment to support students' overall professional literacy and comprehensive development, thereby forming a complementary relationship between aesthetic education and vocational training objectives.

Despite these theoretical advancements, empirical research indicates persistent instructional challenges. Teacher-centered lecturing remains dominant in many vocational music classrooms, resulting in limited student participation and shallow learning outcomes (Liu Baoxin, 2019). Instructional activities frequently emphasize lower-level cognitive processes—such as background explanation and basic recognition—while higher-order thinking skills, including analysis and evaluation, receive insufficient attention (Bloom et al., 1956; Wang Hui, 2017). Moreover, inadequate alignment between music appreciation content and vocational skill development has been shown to weaken students' learning motivation and engagement (Liu Yong, 2021).

2. Flipped Classroom Teaching Method

The flipped classroom teaching method is widely recognized as a learner-centered instructional approach that reallocates knowledge transmission to the pre-class stage while reserving classroom time for knowledge internalization through interaction, discussion, and inquiry (Bergmann & Sams, 2012). In this model, students typically engage with microlectures and guided learning materials before class, enabling in-class sessions to focus on problem-solving, collaborative learning, and higher-order cognitive activities.

Several instructional frameworks have been proposed to support effective flipped classroom implementation. Zhong Xiaoliu et al. (2013) introduce a three-layer instructional design framework encompassing learning resources, interactive activities, and evaluation mechanisms, which has been widely applied in music-related and vocational courses. In vocational education contexts, researchers stress the importance of integrating flipped classrooms with practice-oriented tasks to establish a “learning–practice–reflection” cycle that supports both cognitive development and skill acquisition.

3. Critical Thinking in Music Appreciation

Critical thinking is commonly conceptualized as comprising both dispositions and cognitive abilities (Ennis, 1987). Dispositions include open-mindedness and evidence-seeking, while abilities involve analysis, evaluation, inference, and self-regulation. Within music appreciation education, critical thinking is reflected in students’ capacity to analyze musical structures, evaluate diverse interpretations, and construct innovative aesthetic judgments.

Assessment of critical thinking generally adopts a multidimensional approach that combines disposition-based scales with ability-oriented indicators. Huo Yanli (2023) proposes an evaluation framework incorporating thinking disposition, analytical ability, and practical application. Quantitative instruments such as standardized critical thinking tests are often supplemented by qualitative measures, including classroom observation and reflective tasks, to provide a more comprehensive assessment of learners’ critical thinking development.

4. Application of Flipped Classroom in Education

Existing research generally supports the effectiveness of the flipped classroom teaching method across diverse educational contexts. Meta-analytic studies indicate that flipped classrooms often outperform traditional instructional approaches in terms of knowledge retention, learner engagement, and the development of higher-order thinking skills (Sattar et al., 2019). In vocational education, flipped classrooms have been shown to be particularly effective in promoting the integration of theoretical knowledge and practical competence.

However, several limitations remain in the current body of research. Empirical studies focusing specifically on music appreciation courses in higher vocational colleges are relatively scarce, particularly those examining the role of

flipped classrooms in cultivating critical thinking ability. In addition, many studies emphasize observable learning outcomes—such as participation and satisfaction—while providing limited analysis of students’ higher-order cognitive development. These gaps highlight the need for further empirical investigation into the pedagogical value of flipped classroom instruction in vocational music appreciation contexts, thereby providing a rationale for the present study.

Related Studies

Empirical studies have consistently demonstrated the potential of flipped classrooms to enhance learning outcomes across disciplines. Strayer (2012) conducted a controlled experiment in college-level art courses and found that students in flipped classrooms exhibited higher levels of cooperation and task orientation, as well as greater depth in artistic interpretation.

Domestic research in music education reflects a gradual shift from theoretical exploration toward practical implementation. Pan Jin and Xu Dongdong (2017) reported that flipped classroom designs in college music theory courses enhanced students’ knowledge application and creative output. Liu Baoxin (2019) addressed low participation in traditional music classrooms by incorporating video-based pre-class learning and collaborative composition tasks, resulting in substantial increases in classroom engagement.

Cross-disciplinary evidence further elucidates the mechanisms underlying flipped classroom effectiveness. Ma Shanfeng et al. (2018), in a medical education context, found that flipped classrooms significantly improved students’ critical thinking abilities, with in-class interaction quality strongly associated with cognitive gains. These findings suggest that structured interactive activities may similarly foster critical thinking in music appreciation settings.

Despite encouraging results, many existing studies focus on general higher education or short-term interventions and offer limited insights into sustained curriculum integration in vocational contexts. Moreover, assessment practices often emphasize observable participation rather than systematic development of higher-order thinking skills. Addressing these limitations remains an important direction for future research.

Methodology

This study employed a one-group pretest-posttest design to investigate the effectiveness of the flipped classroom teaching method in enhancing vocational college students' critical thinking ability in music appreciation courses and to examine students' satisfaction with this flipped classroom approach.

1. Participants

There are 780 second-year students in music appreciation courses at a vocational college in Shandong Province, China. The study adopted a purposive sampling, selecting a class of 78 students as the research subjects.

2. Research instruments

Three research instruments were employed in this study:

2.1 Flipped classroom lesson plans.

Lesson Plans' appropriate evaluated by three experts; 2 flipped classroom teaching method experts, 1 critical thinking expert, was $\bar{x} = 4.67$, S.D. = 0.58. These means the lesson plans were appropriated enough to use. It refers to a 16-hour instructional framework designed to improve students' critical thinking through the Flipped Classroom Teaching Method in a Music Appreciation course. The plan is divided into two modules—Classical Music Themes (8-hours) and Modern Folk Music Transformation (8-hours)—each following a three-stage cycle:

1.Pre-class: Self-study via teaching videos and preparation activities to achieve set objectives.

2.In-class: Assessment through tests and active learning activities to internalize knowledge.

3.Post-class: Summary and Improvement, Reflection and feedback sessions to consolidate learning and refine analytical skills.

2.2Critical thinking ability test A critical thinking ability test IOC evaluated by three experts; 2 flipped classroom teaching method experts, 1 critical thinking expert, was 1.00 for all 40 items. The test was used as both the pre-test and post-test, consisted of 40 multiple-choice items covering five dimensions: analytical ability, evaluative ability, inference ability, explanation ability, and self-regulation. The test was administered in a closed-book, paper-based format with a time limit of 50 minutes. To ensure measurement reliability, internal

consistency was examined using Cronbach's alpha, yielding a reliability coefficient of $\alpha = 0.85$, which indicates a high level of reliability.

2.3 Student satisfaction questionnaire A student satisfaction questionnaire IOC evaluated by three experts; 2 flipped classroom teaching method experts, 1 critical thinking expert, was 1.00 for all 20 items. It was used after the intervention to assess learners' perceptions of the flipped classroom experience. The questionnaire comprised 20 items measured on a five-point Likert scale (1 = strongly disagree to 5 = strongly agree) and covered four dimensions: applicability of course resources, effectiveness of in-class interaction, improvement of learning experience, and overall satisfaction. The reliability analysis produced a Cronbach's alpha coefficient of $\alpha = 0.88$, indicating strong internal consistency.

3. Data Collection Procedures

Data were collected over a 4-week period using a pretest-posttest design, with the testing environment strictly controlled to prevent testing effects. Participants completed a critical thinking pre-test, engaged in a flipped classroom intervention, and then took the same test as a post-test alongside a satisfaction questionnaire. All data were immediately collected, organized in Microsoft Excel, and analyzed using SPSS 26.0.

4. Data Analysis

Quantitative data analysis was conducted with a significance level of $\alpha = 0.05$. First, Cronbach's alpha confirmed the internal consistency of the critical thinking test and satisfaction questionnaire. The test verified the normality of pre-test and post-test scores ($p > 0.05$), supporting the use of a paired-samples t-test. Descriptive statistics (M, SD) were calculated to summarize students' test scores and survey responses. To evaluate the flipped classroom intervention's impact on critical thinking, a paired-samples two-tailed t-test compared pre- and post-test scores. Additionally, Cohen's d was calculated to quantify the effect size ($d = 0.2$ for small, 0.5 for medium, and 0.8 for large).

Result

Pre-test and post-test data were used to answer the first research question "After using the flipped classroom teaching method, is students' critical thinking ability in music appreciation courses higher compared to before?". To assess the differences between the pre-test and post-test results, descriptive statistical analyses, normality tests, and paired-samples t-tests were conducted.

Dimensions	Full Score	Pretest		Posttest		N	t-test	p
		M	S.D.	M	S.D.			
Module1 Analysis	9	4.04	0.84	7.64	0.58	78	32.87	0.00
Module2 Evaluation	10	4.31	0.79	8.51	0.55	78	40.21	0.00
Module3 Inference	8	3.99	0.73	6.67	0.55	78	31.46	0.00
Module4 Explanation	7	3.38	0.49	5.72	0.53	78	29.18	0.00
Module5 Self-regulation	6	3.54	0.50	4.69	0.54	78	18.94	0.00
Total	40	19.26	0.67	33.23	0.55	78	53.62	0.00
**p<.001								

Table 1 Dependent t-test Results of Pre-test and Post-test Critical Thinking Scores

The results demonstrate that the instructional intervention had a highly significant positive impact on students' critical thinking abilities. A paired-samples t-test revealed a statistically significant increase in overall critical thinking scores from the pre-test ($M = 19.26$, $SD = 0.67$) to the post-test ($M = 33.23$, $SD = 0.55$), $t(77) = 53.62$, $p < .001$.

Moreover, this significant improvement was consistently observed across all five sub-dimensions of critical thinking. Specifically, students showed substantial gains in analysis, increasing from $M = 4.04$ ($SD = 0.84$) to $M = 7.64$ ($SD = 0.58$), $t(77) = 32.87$, $p < .001$; evaluation, from $M = 4.31$ ($SD = 0.79$) to $M = 8.51$ ($SD = 0.55$), $t(77) = 40.21$, $p < .001$; inference, from $M = 3.99$ ($SD = 0.73$) to $M = 6.67$ ($SD = 0.55$), $t(77) = 31.46$, $p < .001$; explanation, from $M = 3.38$ ($SD = 0.49$)

to $M = 5.72$ ($SD = 0.53$), $t(77) = 29.18$, $p < .001$; and self-regulation, from $M = 3.54$ ($SD = 0.50$) to $M = 4.69$ ($SD = 0.54$), $t(77) = 18.94$, $p < .001$.

In addition, a 20-item satisfaction questionnaire was administered at the end of the instructional intervention. The interpretation of the results followed commonly accepted criteria: mean scores between 4.21–5.00 indicate very satisfied, 3.41–4.20 indicate satisfied, 2.61–3.40 indicate neutral, 1.81–2.60 indicate dissatisfied, and 1.00–1.80 indicate very dissatisfied. These findings provided a multidimensional understanding of students' perceptions of the flipped classroom approach and directly addressed the second research objective regarding learner satisfaction.

Statements	N	M	S.D.
1. The pre-class learning materials are easy to understand.	78	4.10	0.47
2. The learning resources are clearly presented.	78	4.03	0.43
3. The learning materials are suitable for my learning level.	78	4.21	0.47
4. The materials help me understand musical concepts.	78	4.18	0.45
5. The resources support independent learning.	78	4.15	0.51
6. Classroom discussions help me understand musical works.	78	4.27	0.53
7. Group activities encourage me to express my ideas.	78	4.23	0.48
8. In-class interaction promotes active participation.	78	4.23	0.53
9. Classroom activities stimulate deeper thinking.	78	4.23	0.51
10. The flipped classroom increases interaction opportunities.	78	4.08	0.45
11. The flipped classroom improves my learning experience.	78	4.19	0.46
12. The course increases my learning motivation.	78	4.19	0.46
13. The course helps me develop independent thinking.	78	4.13	0.52
14. I am more confident in analyzing musical works.	78	4.12	0.43
15. The flipped classroom enhances my interest in learning.	78	4.13	0.44
16. I am satisfied with the flipped classroom course.	78	4.26	0.47
17. The flipped classroom meets my learning needs.	78	4.29	0.56
18. I would like to take similar courses in the future.	78	4.32	0.57
19. The flipped classroom improves my learning efficiency.	78	4.17	0.54
20. Overall, I have a positive attitude toward this course.	78	4.08	0.64
Total	78	4.19	0.48

Table 2 Mean and Standard Deviation of Students' Satisfaction

The survey ($N = 78$) reveals exceptional satisfaction with the flipped classroom, achieving an overall mean of 4.19 (S.D. = 0.48) out of 5.00.

Major Strengths: Students strongly felt the course met their learning needs and heavily favored the interactive in-class discussions for deepening their understanding. This resulted in a high demand for similar courses in the future (Highest score: $X = 4.32$).

Key Outcomes: The model successfully boosted student engagement, learning motivation, and confidence in analyzing music.

Area for Improvement: While pre-class materials were effective, their visual clarity and presentation (Lowest score: $\bar{x} = 4.03$) offer a minor opportunity for refinement.

Discussion

This study demonstrated that the flipped classroom significantly improved vocational college students' overall critical thinking in music appreciation courses and yielded high learner satisfaction. These results support existing research that this pedagogy effectively promotes higher-order thinking and active learning.

Consistent with prior studies (Strayer, 2012; Sattar et al., 2019), analytical and evaluative abilities showed the most substantial gains. Through in-class guided tasks—such as decomposing musical elements, engaging in group debates, and peer evaluation—students moved beyond surface-level appreciation to deeper analytical engagement. This proves that flipped learning is particularly well-suited for art-related subjects emphasizing multiple interpretations.

Improvements in inference and explanation abilities were also notable. By combining pre-class autonomous learning with interactive in-class sharing, students became more capable of drawing logical conclusions and articulating structured interpretations. This highlights the crucial role of social interaction and collaborative dialogue in refining critical thinking (Li Jinfeng & Zhang Jie, 2015; Huang Yueying, 2020).

While self-regulation ability improved significantly, the gains were comparatively smaller. Because self-regulation requires sustained metacognitive practice (Huo Yanli, 2023), the short four-week intervention and the reliance on

basic post-class journals—without systematic metacognitive guidance throughout the process—limited substantial development in this specific dimension.

Beyond cognitive outcomes, student satisfaction was consistently high. Learners valued the pre-class resources, engaging in-class interaction, and increased autonomy (Bergmann & Sams, 2012). The shift of the teacher's role from a sole knowledge transmitter to a facilitator created a supportive environment that fostered confidence.

Overall, the flipped classroom effectively addresses the limitations of traditional teacher-centered instruction. By integrating pre-class autonomous learning with in-class interaction, it provides a powerful pedagogical framework for cultivating both critical thinking and positive learning experiences in vocational music education.

Conclusion

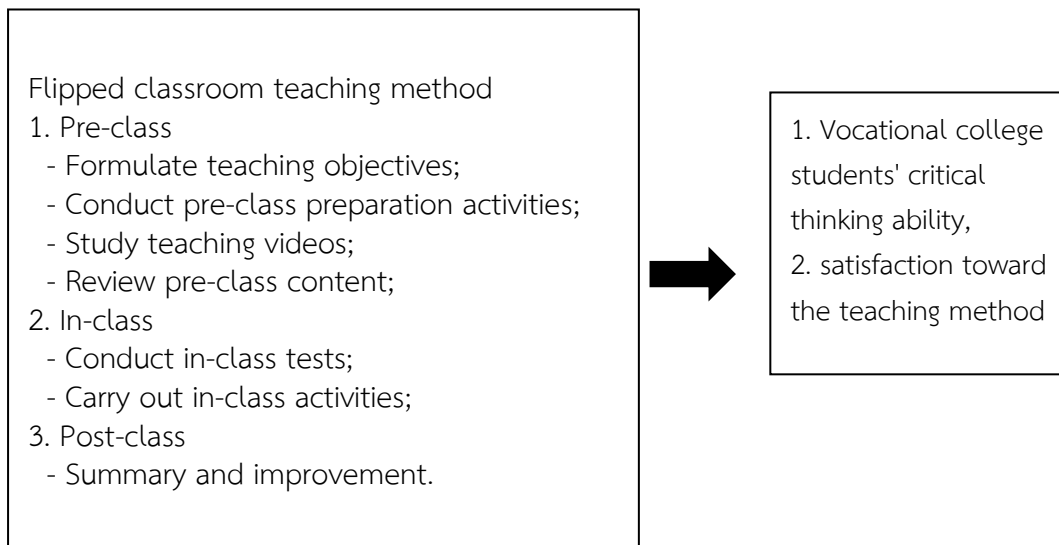


Figure 1 Conceptual Framework

This study demonstrated that the flipped classroom significantly enhanced vocational college students' critical thinking—especially analytical and evaluative skills—in music appreciation courses. By shifting foundational learning to pre-class, in-class time was maximized for interactive, higher-order cognitive

tasks. Furthermore, students reported high satisfaction with the accessible resources, engaging interactions, and increased learning motivation. While these results strongly support the flipped model's effectiveness, the short, single-group design warrants caution. Future research should employ control groups and longer interventions to verify long-term impacts.

Recommendations

1. Optimize teaching design for targeted critical thinking. Address imbalances in skill development by emphasizing self-regulation through structured reflection tools and metacognitive training across all learning stages. Provide tiered pre-class resources to suit different learner levels. Additionally, enrich in-class activities with peer/self-assessments, and extend the intervention to at least one full semester to evaluate long-term impacts.

2. Strengthen teacher training and collaborative support. Provide systematic training for teachers on flipped classroom design, facilitation skills, and educational technology. Establish interdisciplinary communities (e.g., between music and tech educators) to co-design and share high-quality teaching resources. Furthermore, offer continuous mentorship, constructive feedback, and incentives to sustain teaching reforms.

3. Enhance future research designs and methodologies. Adopt quasi-experimental designs with control groups to clearly establish causal relationships. Expand sample sizes across diverse regions, grades, and college types to improve generalizability. Finally, utilize a mixed-methods approach—combining quantitative test data with qualitative interviews and observations—to deeply explore how the flipped model influences critical thinking.

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