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Instructional design of classroom instructional skills based on the ADDIE model

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Abstract. With the rapid societal changes, the diversity of educational design approaches has increased. Educational professionals are now confronted with new challenges in training pre-service music teachers. They are required not only to employ emerging technologies for knowledge transfer but also to focus on cultivating teaching abilities to better meet the demands of prospective employers. This study utilizes the five phases of the ADDIE model (Analysis, Design, Develop, Implement, Evaluate) to design and develop a classroom teaching skills module aimed at enhancing the teaching abilities of pre-service music teachers. The application of the ADDIE instructional model in designing and developing modules for teaching pre-service music teachers is explored. The research findings indicate that the classroom teaching skills module has significantly improved the teaching abilities of pre-service music teachers. This study aims to reveal pathways for instructional reform in pre-service music teacher education, aligning it more effectively with societal needs and expectations.

Keywords. ADDIE model, classroom teaching skills, instructional design, pre-service music teachers.

Introduction

With the continuous increase in the number of graduates from Chinese universities, particularly surpassing the record of 10 million in 2022, recent graduates are facing unprecedented challenges in employment. It is anticipated that the number of university graduates will further rise in 2023, with a noticeable trend of declining employment rates among graduates in teacher education (CCTV News, 2022). This situation places higher

demands on pre-service music teachers, requiring them not only to excel on stage but also to possess outstanding teaching and organizational abilities for diverse artistic activities (Ministry of Education of China, "Full-Time Compulsory Education Music Curriculum Standards", 2019).

However, employers generally reflect deficiencies in pre-service music teachers' educational ability and artistic expression, and even the phenomenon of "stage fright" (Zou Dayong and Dong Kemi, 2009). To address this issue, as early as 1994, China issued the "Outline of Teacher Professional Skills Training for Students in Normal Universities"

(referred to as VST), which explicitly outlines 10 classroom teaching skills that students in normal universities should learn. Nevertheless, due to the historical emphasis of normal universities on theoretical learning for pre-service teachers and a relative lack of focus on practical teaching operation training, the cultivation of teaching abilities has become disconnected from theoretical learning, constraining the comprehensive development of pre-service music teachers (Xiong Caixia, 2015).

The traditional education mode of practical courses has problems such as short time and unsatisfactory environment, which makes it difficult to effectively improve the teaching ability of pre-service teachers (Dang Shuai, 2013). In order to meet this challenge, this study is dedicated to finding a new hybrid teaching model to change the traditional education model and improve the classroom teaching ability of pre-service music teachers. Through this study, it aims to stimulate the enthusiasm and confidence of pre-service music teachers to learn teaching skills and help them improve their teaching skills to better meet the needs of the times.

Emphasising the process of instructional design, this study focuses on the design and implementation of a classroom teaching skills module based on the ADDIE model. The focus was on how to improve pre-service music teachers' classroom teaching abilities through a blended instructional design model.

ADDIE Model

The instructional design model was developed and designed by the Centre for Educational Technology at Florida State University (Goksuetal, 2017). It is the more mature and currently most widely used and discussed instructional design model in the West (Peng Han, 2018). Although a wide variety of instructional design models have emerged since the 1970s (Gustafson & Branch, 2002), virtually all of them incorporate the core elements of ADDIE (Gagne R M, Wager W W, Golas K C, 2010). With the continuous development of international curriculum reform, the ADDIE theoretical model has been characterised as a systematic approach to curriculum development and instructional design in domestic and international academic circles (Fang M J, Zheng x X, Hu w Q, 2011).

Specifically, the ADDIE model consists of five phases: Analysis、Design、Develop、Implement、Evaluate (Peng Han, 2018). This model offers systematic and structural guidance for instructional design, ensuring the quality and effectiveness of the curriculum through a step-by-step process. The widespread application of ADDIE has made it an indispensable instructional design tool in today's education field.

Application of the ADDIE Model in Designing and Developing Classroom Teaching Skills Courses

In the instructional design of pre-service music teacher classroom teaching skills, the overall design unfolds in accordance with the Analysis Phase – Design Phase – Develop

Phase – Implement Phase – Evaluate Phase. This approach ensures a cohesive and progressive instructional design process.

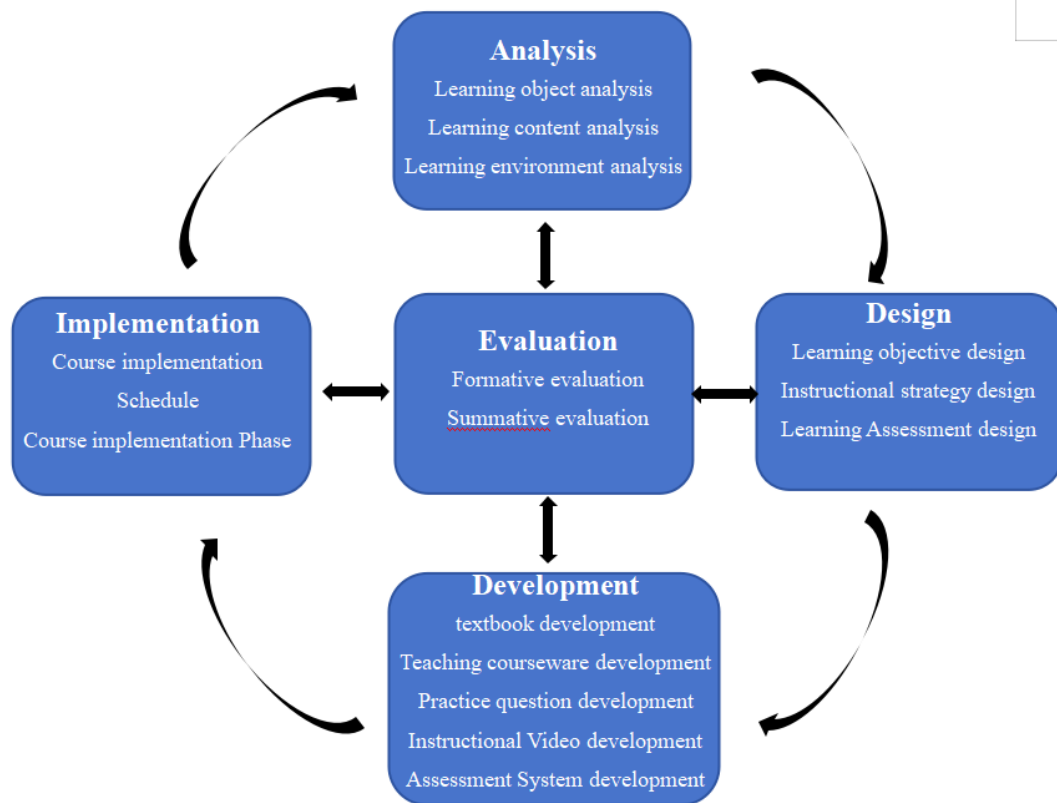


Figure 1. ADDIE model-based curriculum design framework for classroom teaching skills

1. Analysis Phase

The goal of the Analysis Phase is to identify the gaps between the actual performance level of pre-service music teachers and the desired target level, and to set specific course objectives. The analysis process includes learning object analysis, learning content analysis, and learning environment analysis.

a. Learning Object Analysis

At the beginning of the study, the researcher found that pre-service music teachers generally had low teaching competence after employment, making it difficult for them to fulfil their teaching roles. In order to investigate the factors affecting the teaching competence of pre-service music teachers, the researcher initiated the present study.

Although pre-service music teachers received systematic professional education, the focus was on theory and music professional skills, with relatively little practical teaching experience. Practical courses in schools mainly focus on educational internship and Microteaching, and there is a lack of specialised courses to improve classroom teaching ability. However, in the actual teaching process, Microteaching and educational internship do not play the proper role, and the form often overrides the content. The time arrangement of Microteaching is unreasonable and the process is too complicated, which makes it difficult to complete all the links in the training process, lacks good articulation, and the final effect is not satisfactory (Li Qianqian, 2015).

Additionally, students lack teaching experience before the internship, making it challenging for them to be competent in teaching upon entering the internship unit. Often, they find themselves limited to engaging in office-related tasks. As educational internships and microteaching are overly formalized, students struggle to develop a strong interest, and teachers merely go through the motions. Consequently, the assistance in improving teaching skills is relatively limited (Lu Enxiong, 2012).

In addition, the primary motivation for many students to learn classroom teaching skills is to qualify as entry-level teachers by passing the teacher certification exam (In China, a teacher's certificate is a licence for those working in the education sector, referred to as NTCE) . However, due to the limited availability of teaching skills programs in schools, many pre-service music teachers are willing to invest significantly to seek training institutes that enhance their test-taking skills. Nonetheless, since such training primarily focuses on the examination, the teaching method is singular, and the teaching process is formulaic. This approach provides limited assistance in improving the teaching skills of pre-service teachers.

b. Learning content analysis

Pre-service music teachers usually enter teaching positions in primary and secondary schools after graduation, and given that high school textbooks cover subject areas in both primary and lower secondary schools, the researchers ultimately chose high school textbooks with comprehensive content coverage as the textbooks for this study. According to China's General High School Music Curriculum Standards, the content of high school music is divided into six modules, namely, Music Appreciation (compulsory course), Singing, Instrumental performance, Music creation, Music and dance, and Music and theatre performance (optional course). Although the educational functions and roles of each module have different emphases, music appreciation accounts for a large proportion of high school music courses. In addition, singing classes, as the basis of appreciation classes, also occupy a large proportion in primary schools and junior high schools. In view of this, after discussions between the researchers and two experts who designed and developed the materials, they decided to select 2 music appreciation course texts, 2 singing course texts, 1 performance course text, 1 music creation course text, and 1 music and dance course text. Text, 1 music and drama performance text as learning material for classroom teaching skills module. In addition, in the final comprehensive skills practice class, one lesson from each module is selected as learning materials for students' teaching practice. Through this selection, we aim to provide a comprehensive and balanced learning experience that adequately covers the various modules specified in the Senior Secondary Music Curriculum Standards.

c. Learning environment analysis

The classroom teaching skills module adopts a blended teaching mode, and the learning environment is divided into an online learning environment and a classroom learning environment.

The online learning environment includes network hardware and software configuration as well as online learning platform with various resources. Teachers need to prepare PPT, audio and video materials before class. For this purpose, images, audios and videos were searched on the CCTV website www.cctv.com, Baidu www.baidu.com and the music platform <https://music.163.com/>, PPTs for lessons were created, and a WeChat group was set up to facilitate communication among students. In addition, the Learning Pass APP

was used for students to upload practice work and download learning materials to facilitate learning exchange.

The classroom learning environment is set up to include more than just traditional desks and chairs, but focuses on providing a multimedia classroom that promotes hands-on teaching and learning for students. This environment is equipped with state-of-the-art equipment such as projectors, instructional computers, LED displays, and instructional blackboard all-in-ones that are designed to create a more interactive and hands-on learning atmosphere for students.

2. Design phase

The design phase provides the basis and prerequisite for the Develop, Implement and Evaluate phases. The design phase consists of the design of Design of learning Objectives, Design of teaching strategies and Design of Learning Assessment

a. Learning Objective Design

Under the module of classroom teaching skills, the teaching objectives of the classroom are divided into four areas:

Knowledge Objectives: to understand the six modules of the senior secondary music curriculum (Music appreciation, Singing, Instrumental performance, Music creation, Music and dance, and Music and theatre performance), to master the key knowledge and content of each module, and to be able to write a lesson plan for each module.

□ Skills Objective: Through the classroom teaching skills module, students will master the set induction skills, questioning skills, explaining skills, blackboard—writing skills, presentation skills and closing skills, and be able to apply them flexibly in the classroom, thus improving the level of teaching ability.

□ Emotional Objective: to develop students' preference for classroom teaching skills lessons, to feel the charm of the classroom and the fun of becoming a teacher in order to enhance the motivation of learning.

□ Learning Strategy Objective: Through experiential teaching, guide students to flexibly use the practice method and situational learning method to cultivate students' self-learning awareness and learning ability.

b. Instructional Strategy Design

According to China's "General High School Music Curriculum Standards", researchers screened 15 texts from the six modules of high school music textbooks to form 7 units, of which 6 units were used for knowledge and skill training, and 1 unit was included in comprehensive skills training. At the same time, the six music teaching skills (set induction skills, questioning skills, explaining skills, blackboard—writing skills, presentation skills and closing skills) were organically integrated into the learning content according to a first-instance-first-out approach.

In order to ensure that students can fully master the knowledge and skills, the classroom teaching skills programme is divided into knowledge skills lessons and practical exercises. In the knowledge skills class, the teacher will explain the relevant knowledge and skills in depth. In the practical exercise class, the teacher triggers students' initiative through teaching demonstration and hands over the classroom to the students so that they can practice teaching on the podium. Through this orderly teaching arrangement, the aim is to promote

students to achieve better integration in theoretical learning and practice, so as to cultivate professionalism with comprehensive music teaching skills.

c. Learning Assessment Design

In the teaching and learning process, the researchers used a combination of qualitative and quantitative evaluation methods. Qualitative evaluation helps to identify deficiencies in the learning material that can be corrected in time during the learning process. Quantitative assessments, on the other hand, are used to record student performance and provide quantitative results.

In order to implement effective assessment, the researchers first developed evaluation criteria for each teaching skill. During the training process, students would conduct self-evaluation based on these criteria as part of their usual training grade, which accounted for 40 per cent of the total assessment grade. After the training of individual teaching skills, a comprehensive training of teaching skills is conducted and evaluated by the instructor, which accounts for 60 per cent of the total assessment grade.

3. Development Phase

The Development phase is the selection and production of teaching resources, which is carried out through the collection of teaching materials (Liu Qiong, 2022). The researchers carried out the development of the classroom teaching skills module in the following aspects: developing teaching resources (textbook, teaching courseware, practice questions, teaching videos); and Development of an assessment system.

a. textbook development

Learning Pass is a professional mobile learning platform for mobile terminals such as smartphones and tablets. The researchers downloaded the music textbook published by People's Music Publishing House on the electronic textbook website (dzkbw.com) and followed the six modules of the music textbook (music appreciation, singing, performance, music composition, music and dance, music and drama performance), extract the 15 selected texts from the electronic textbook, divide them into independent units, and upload them to the folder of the Learning Pass. Before learning the course, teachers only need to open the Learning Pass, find relevant materials and click forward, and the materials will be immediately sent to the class. Students will receive notifications on their mobile phones immediately, and they can start learning by opening the Learning Pass.

b. Teaching courseware development

The researchers used PowerPoint and WPS to complete the production of teaching courseware. In making the teaching PPT, by inserting audio and video in the PPT in the form of embedding, modern information technology was fully utilised to create learning scenarios and stimulate students' interest in learning. After making the PPT, upload it to the Learning Pass library. Students can view them in the Learning Pass library for advance study and after-class revision.

c. Practice question development

In order to enable pre-service music teachers to familiarise themselves with the content of the textbook before class, the researchers created some practice questions to test students' pre-study and at the same time help them consolidate their knowledge. The practice

questions were created on the Learning Pass platform and included fill-in-the-blank, single-choice, multiple-choice and other question types. The questions are uploaded and saved in the teacher's test paper library, so when teachers need to send test papers to students, they can send them directly through the Learning Pass platform.

d. Instructional Video development

The researchers obtain teaching video resources from three platforms, namely CCTV (cctv.com), Jitterbug (douyin.com), and One Teacher One Excellent Class (<http://1s1k.eduyun.cn>). Before the class, the relevant video resources are uploaded to the Learning Pass platform, and students can watch and learn in advance. In addition, the video resources of douyin and CCTV were added to the teaching PPT, which enriched the content of the classroom teaching and mobilised the students' interest in learning at the same time, making the classroom more vivid and lively.

e. Assessment System development

The development of the assessment system is carried out through the "Learning Pass" software. Prior to class, students are required to prepare for and complete practice questions, all of which are done on the "Learning Pass" platform. After students submit the exercises, the system will instantly display their scores, eliminating the need for teachers to make additional corrections. Teachers can see how well students have studied before class based on their scores. In addition, to assess each student's learning, student assessment items are set up in the "Learning Pass" platform according to the nature of the course. The assessment items include 10% participation in talking, 20% examination results, 15% reading materials, 15% regular assignments, 10% signing in, 10% watching audio and video, and 20% completing group tasks. The system scores students according to their completion, which reduces teachers' workload.

4. Implementation phase

The purpose of the implementation phase is to prepare the learning environment to engage students. A common procedure associated with the implementation phase is to prepare teachers and students. Completion of the implementation phase enables access to the actual learning environment where students begin to construct new knowledge and skills to close the achievement gap (Branch, R. M. & Berlin: Springer, 2009).

According to the ADDIE model of educational curriculum design, the implementation phase can be divided into two main parts: Course implementation Schedule and Course implementation Phase.

a. Course implementation Schedule

In accordance with the syllabus, the course is divided into two phases. The first phase is the training week of the course, which is seven weeks long, with a total of 28 classroom hours, two classes per week, two classroom hours each time. It mainly implements the teaching and practice of the classroom teaching skills programme. This phase contains two key areas, namely knowledge skills acquisition and skills training. After the learning of knowledge skills in each music module, we arranged 1~2 hours of skill training sessions to help students consolidate the knowledge and skills they have learnt and internalise what they have learnt in practice.

The second phase is a practical exercise week, For a period of one week, with four lessons. This phase focuses on preparation and training for course validation, including the presentation of course outcomes. The course outcomes will be tested by means of podium practice. At the same time, this is also the stage for the presentation of learning outcomes.

Table 1. Classroom Teaching Skills Instruction Implementation Table

Week	Curriculum Modules	Learning Content	Distribution of Hours for Instruction
		set induction	
-2	Music appreciation	skills explaining skills teaching plan	6 class hours
		design	
-3	singing	questioning skills blackboard— writing skills teaching plan	6 class hours
		design	
	Instrumental performance	presentation skills closing skills teaching plan	4 class hours
		design	
	Music Creation	comprehensive skill training teaching plan	4 class hours
		design	
	Music and Dance	comprehensive skill training teaching plan	4 class hours
		design	
	Music and Theatre Performance	comprehensive skill training teaching plan	4 class hours
		design	
tage 2	Practical exercises practice	comprehensive skill training	4 class hours

b. Course implementation Phase

The implementation phase is divided into three parts: before, during and after the course. Based on the design and development phases, the "Learning Pass" platform is used for blended teaching.

Before the formal lesson, teachers and students need to make preparations. Teachers and students download the "Learning Pass" app in advance, and send the operation guide to the WeChat group to instruct students how to operate "Learning Pass". Students can use mobile phones, computers, iPads, etc. to learn on the "Learning Pass" platform. Teachers set

up courses and class groups in advance, and students enter the courses and Learning Pass class groups according to the QR codes or passwords shared by teachers.

Before class:

- Teachers upload learning resources to the "Learning Pass" resource library (PPT, videos, test papers, etc.) and push learning tasks to students.
- Students watch the courseware, videos and related teaching resources and complete self-study. Through online discussion, they can solve the reflection questions at the end of the lesson and complete the online quizzes initially.
- Teachers understand students' learning outcomes through online interaction and checking the background data of "Learning Pass" to determine the key points and difficulties of classroom teaching.

During class :

During classroom instruction, the teacher explains knowledge and skills and provides targeted instruction based on student feedback questions. "Conduct teaching demonstrations based on the content of the learning materials."

- Students engage in group discussions and exchanges to summarise the key knowledge and skills from the course. Each group recommends a representative to mimic the teaching on stage.
- Teachers use group discussion, heuristic teaching and other teaching tools to carry out classroom teaching flexibly, evaluate teaching, stimulate students' interest in learning and improve learning results.

After class : □

- Students work in groups to discuss what they have learnt in class and design their own teaching plan. Record the teaching video through the video equipment and send it to "Learning Pass".
- Teachers watch the teaching video, evaluate it and make suggestions for modification. Select the best works and send them to the class group for students to share and learn.

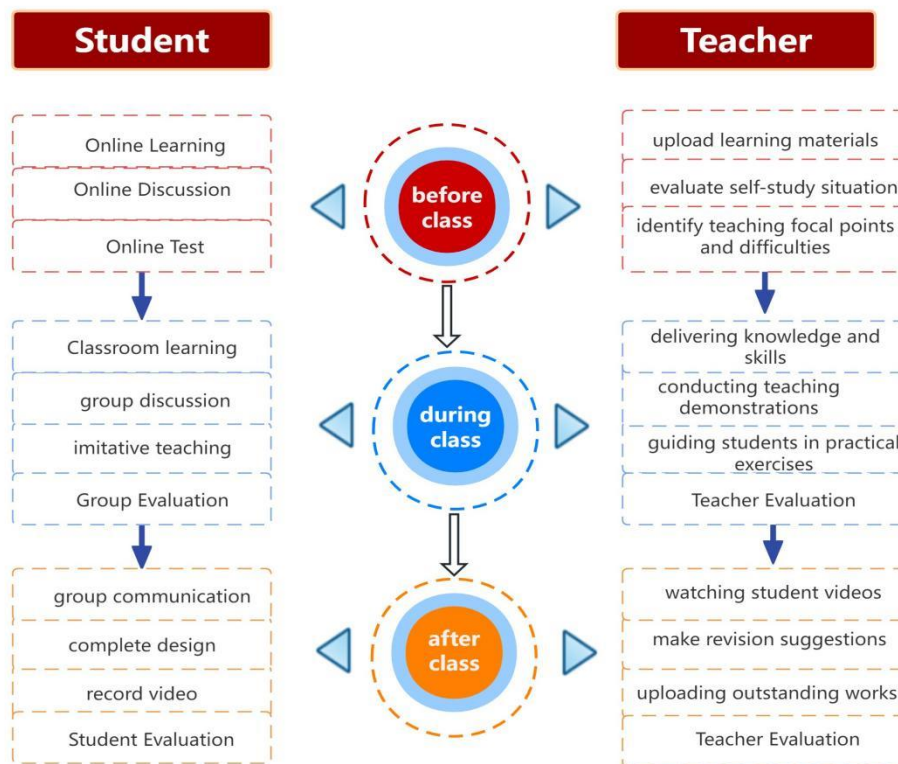


Figure 2. Instructional Implementation Chart

5. Evaluation Phase

The last phase in the ADDIE model is evaluation. The main objective of the assessment phase is to confirm whether the objectives have been achieved and to determine what next steps need to be taken to further improve the efficiency and success of the project (Manichander, 2016). The evaluation phase can be divided into two parts: formative and summative evaluation.

a. Formative evaluation

Formative evaluation occurs when students and teachers conduct the study and is carried out throughout all stages of analysis, design, develop, implement of the entire teaching and learning process. The researcher analysed the content and context of the classroom teaching skills learning and discussed it with experts. With the advice of experts, the researcher designed the outline of the classroom teaching skills module. Then, the researcher developed a prototype of the classroom teaching skills module for piloting. Through the pilot, experts evaluated the content and context of the module to understand the pros, cons and effectiveness of the classroom teaching skills module. Once the classroom teaching skills module was fully developed, it was used to teach pre-service music teachers classroom teaching skills. Therefore, the entire module was evaluated by experts prior to the execution of the main study. The researcher was given advice at each stage of module development. Student evaluations were also reflected in a realistic and objective way through the Learning Pass platfo

b. Summative evaluation

Summative evaluation occurs at the end of instruction and is a direct evaluation of the results. At the end of the course, the classroom teaching skills module was validated through questionnaires and interviews. Although the assessment was carried out with the help of teachers', students' and experts' suggestions throughout the implementation phase, post-tests and interviews were conducted after the implementation of the intervention of the classroom teaching skills module in order to check the impact of this classroom teaching skills module on students' teaching competence. The module brought about a significant improvement in the classroom teaching skills of the pre-service music teachers, which was verified by the results of the pre- and post-intervention tests.

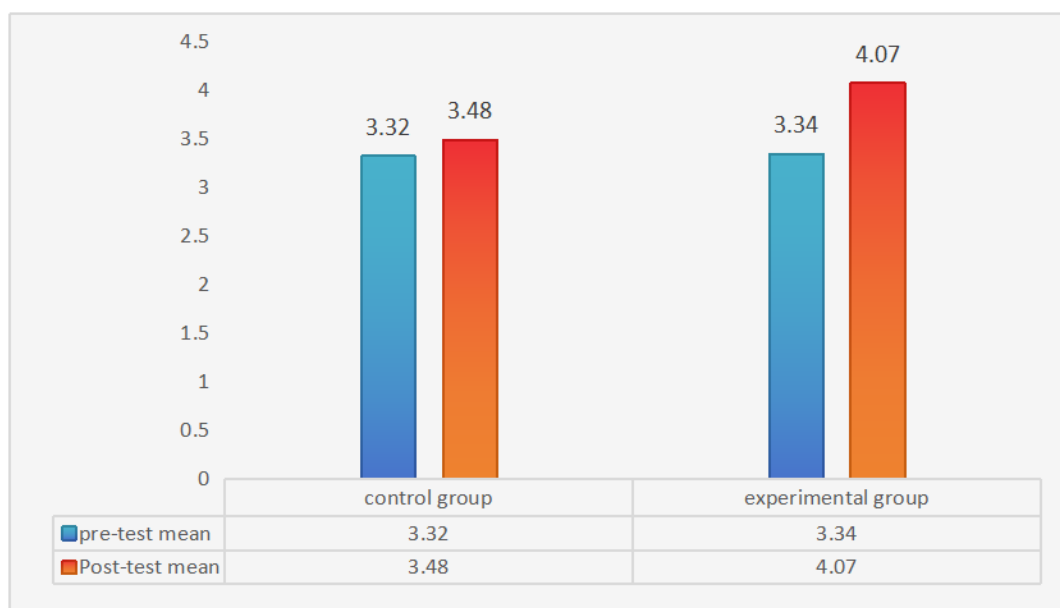


Figure 3. Pre-test and post-test mean scores for control and experimental groups

Discussion

This study focuses on the process of designing and implementing the classroom teaching skills module based on the ADDIE model, paying attention to the effect of the practical application of instructional design. The quantitative data showed a significant increase in the mean scores of the experimental group, proving the effectiveness of the intervention of the classroom teaching skills module. This finding supports the effectiveness of the hybrid instructional design model in enhancing the teaching skills of pre-service music teachers. The qualitative data also showed positive results, with pre-service music teachers giving very positive ratings to the classroom teaching skills module. They demonstrated significant confidence and enthusiasm in the acceptance and application of the instructional design, which provides strong implications for future educational practice.

Overall, the classroom teaching skills module design based on the ADDIE model presents obvious positive effects in improving the teaching ability of pre-service music teachers. Through the verification of the actual application effect, it is expected that this hybrid instructional design model can provide a more effective path for education and training, and help pre-service music teachers better meet the needs of the times and society.

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