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Effect of Problem-Based Learning (PBL) on Music Teaching Scheme Design and Teaching Practice of Music Normal Students

Feifei Guo[1]   Premjit Kajonpai Larsen[2]   Rekha Arunwong[3]

[1] M.Ed. Student, Curriculum and Instruction Program,
Valaya Alongkron Rajabhat University under the Royal Patronage, Thailand
guofei0.809@163.com

[2,3] Curriculum and Instruction Program, Valaya Alongkron Rajabhat University under the Royal Patronage, Thailand
premjit.ka@vru.ac.th
rekha@vru.ac.th

Abstract

Problem-Based Learning (PBL) teaching methods, wherein teachers guide students to discover, analyze, and solve problems through group discussions, are student-centered and problem-based. The purposes of this mixed quantitative and qualitative research are: 1) to compare the Music Teaching Scheme Design and Teaching Practice academic record of third-year university students before and after using problem-based learning (PBL), and 2) to assess students' satisfaction with problem-based learning (PBL). The sample consisted of 42 university musicology students. Convenience sampling was used in this study. A lesson plan for the Music Teaching Scheme Design and Teaching Practice using PBL pedagogy was the research instrument. Meanwhile, the measurement instruments were: 1) the Music Teaching Scheme Design and Teaching Practice academic record test, and 2) a students' satisfaction questionnaire. After collecting and arranging the experimental data, the paired-sample t-test and the single-sample t-test of the SPSS software were used for data analysis. The results show that: 1) students' Music Teaching Scheme Design and Teaching Practice academic record after using problem-based learning (PBL) is higher than that before learning, and 2) students' satisfaction with the PBL method is at a high level.

Keywords : Problem-Based Learning (PBL), Academic Record, Student Satisfaction

1. Introduction

It is the mission and responsibility of normal universities to train their teachers. All countries pay great attention to teacher training and have introduced several specific measures to promote the development of normal universities to ensure the improvement of teachers' quality (Tian, 2009). The development of music education has a long way to go. The development and improvement of the whole education system not only requires several pioneering leaders with both

political integrity and ability, but also several teaching talents armed with knowledge (Liu, 2012). The development of music education is an important part of comprehensive quality improvement at the national level. Further, with the continuous social progress of the human knowledge system, education work is facing the impact of knowledge updates and severe social situations. The means for developing music education, keeping pace with the times, and maintaining and carrying forward the inheritance of traditional national culture— while nourishing foreign art— are worthy of careful consideration by music educators (Xiao, 2014).

"Music Teaching Program Design and Teaching Practice" is a mandatory course for the university undergraduate music normal major, and its teaching effect is becoming increasingly important to the university talent training mode. The existing teaching methodology is generally based on Herbart's pedagogy: the traditional classroom under the "three centers" model of teachers, teaching materials, and classrooms; the implementation process involves directly imparting knowledge to students. Since the Industrial Revolution, this has been the most stable and widely used teaching model in the global education system for more than 300 years; yet, there are many problems in the process of practice (Chen & Sun, 2021).

By checking students' scores in the school's teaching management system, it was found that after the Music Teaching Program Design and Teaching Practice course in the first semester of the 2020–2021 school year, 88.9% of the students in the sample class scored below 80 points. Therefore, the teaching effect of this course has not been not ideal. Upon reflection, the following problems were identified in classroom teaching:

1) Students' theoretical knowledge learning is solid, but they lack teaching experience, and the actual teaching level is not high.

2) Students have minimal interest in classroom learning.

3) Students lack the ability to learn actively.

To change this situation, we must expand the teaching research of this course and conduct teaching exploration in combination with a new teaching mode. The PBL mode of teaching is teacher-led and problem-centered; its central focus is on students, and it emphasizes practical problem-solving through cooperative exploration (LI, n.d.). By applying the PBL teaching mode in the "Music Teaching Program Design and Teaching Practice" course, students can solve problems in the learning process, deepen their understanding of the teaching program design, improve their teaching practice level, and enhance the classroom teaching effect. Therefore, the PBL teaching mode should be applied in normal music majors' classrooms in colleges and universities: This would help test the feasibility and effectiveness of the PBL teaching mode in teaching practice, and provide a new theoretical basis and practical experience for the teaching reform of normal music majors.

2. Research Objective

2.1 To compare the Music Teaching Scheme Design and Teaching Practice academic records of third-year university students—before and after using Problem-Based Learning (PBL).

2.2 To assess the students' satisfaction with Problem-Based Learning (PBL).

3. Research Methodology

3.1 Samples

The sample of this study is 42 musicology students in a university. This university is located in Zhoukou City, Henan Province, China. It is a local university of general applied normal education. Convenience sampling was performed in this study. According to different majors and student administrative classes, we divided the 198 students into five classes with 42, 42, 41, 42, and 31 students. From among these classes, a class of 42 students was randomly selected.

3.2 Research Instruments

A research instrument is a tool used for experimental research and data collection. The research instrument used in this study included three components: as the experimental instrument, 1) a lesson plan for PBL; as measuring instruments, 2) the Music Teaching Scheme Design and Teaching Practice academic record test and 3) a questionnaire for students' satisfaction. The statistical data used to analyze quantitative data included four parts: 1) mean, 2) standard deviation, 3) the test statistic (denoted t) for the paired t-test, and 4) the p-value corresponding to the given test statistic t, with degrees of freedom df.

3.3 Data Collection

The procedure of data collection was as follows:

3.3.1 This study planned to conduct five sessions—once a week for 2 hours on each occasion, for a total of 10 hours—using the PBL teaching method. In this study, the PBL teaching method—when used in the classroom of music teaching scheme design and teaching practice— was divided into five steps: 1) Bring out the question: Before class, the teacher analyzed the teaching objectives, key points, and difficulties of this lesson; then, the teacher decided to use the explanatory lessons video clip at the Henan Province explanatory lessons competition as the medium and sent this video to the students through the WeChat platform, thereby eliciting the concepts, characteristics, and types of explanatory lessons and meaning. 2) Analyze the problem: In class, the teacher randomly divided 42 students into eight groups. According to the explanatory lessons video released before class, students analyzed problems, determined known and unknown information and problems, and clarified topics. 3) Solve the problem: In class, each group divided labor according to the plan, collected and shared information, and brainstormed independently. During this process, the team members communicated with each other and discussed the problem. 4) Achievement of presentations: Each

group had a student representative in class to explain the concept of lessons, characteristics, type, and significance. After the representative completed the speech, the group members provided a supplementary presentation. 5) Reflective evaluation: In class, each group voted to select the group with the best performance. Each group evaluated the students in the group and selected the students with the best performance in the class. After class, teachers interacted with students through the WeChat platform to jointly solve problems that were not fully understood in the classroom learning process. See the figure below for the specific teaching process:

Picture 1 Flow chart of PBL teaching method

3.3.2 The pre-test and post-test utilized the Music Teaching Scheme Design and Teaching Practice academic record test, which contains two parts: 1) primary and secondary school music teaching program design, and 2) a student presentation video. Both parts contain five scoring standards each. Each scoring standard is set to 20 points. Academic record comprises 50% of the students' lesson plan scores in addition to 50% of student presentation video scores.

3.3.3 The purpose of using the questionnaire is to collect data regarding the students' opinions about the instruction, such as the content of the curriculum, learning activities, and instructional materials. The student satisfaction questionnaire comprised 16 items. Each item has five levels: excellent, very good, good, fair, and poor.

3.4 Data Analysis

According to the research purpose, this study conducted data analysis on the quality of the research instrument and measuring instrument. Three experts—associate professors—scored the validity of the lesson plans and the academic record test. The content validity index (CVI) of each item was calculated to be greater than 0.79, while the item objective congruence (IOC) of each item was greater than 0.5. The researchers used an academic record test to assess the students in class and obtain a data set. This data was then used to measure the item difficulty (p) and item discriminability (r) of the academic record test. The results showed 1) a range of 0.20– 0.80 for the difficulty (p) of each item of the academic record test and 2) the discriminability (r) of each item was greater than 0.2. Using the same raw data set, the Cronbach's alpha coefficient of the reliability of the academic record test was found to be 0.884, which is greater than 0.8. The validity of the student satisfaction questionnaire was scored by three experts, and the IOC of each item was calculated to be greater than 0.5.

4. Research Results

This chapter presents the findings regarding the study's research objectives, which were as follows: 1) To compare the Music Teaching Scheme Design and Teaching Practice academic records of third-year university students—before and after using the PBL. 2) To assess students' satisfaction with PBL. The findings were analyzed through descriptive statistics and t-tests using a statistical package program to determine the progress of the participants after its implementation. The findings are as follows:

Table 1 Statistical symbols

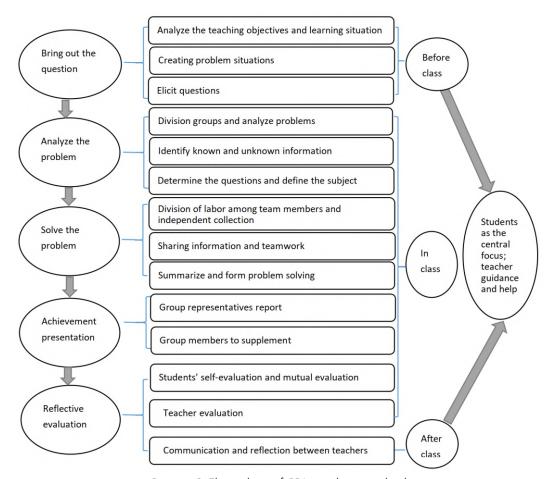| Statistical symbols	Description
$\overline{X}$	The average score of the sample
S.D.	The standard deviation of the difference scores
T	The test statistic (denoted t) for the paired T-test.
P	The p-value corresponding to the given test statistic t with degrees of freedom df.

4.1 Comparisons of Music Teaching Scheme Design and Teaching Practice academic records of third-year university students—before and after using PBL

The result of comparing the different scores of the Music Teaching Scheme Design and Teaching Practice before and after learning through Problem-Based Learning (PBL). The table below shows the descriptive statistics and t-test as analyzed by using the statistical package program. This table aims to answer the research objective of whether using PBL could enhance the music teaching scheme design and teaching practice academic record.

Table 2 Comparison table of academic record results before and after using Problem-Based Learning (PBL)

Group	N	Pretest scores		Posttest scores		t	p
		$\overline{\text{X}}$	S.D.	$\overline{\text{X}}$	S.D.		
Experimental group	42	71.32	5.667	80.10	3.740	16.739	.000

As presented in Table 2, the mean score of the pre-test of students' Music Teaching Scheme Design and Teaching Practice academic records was 71.32 (SD = 5.667), and post-test of students' Music Teaching Scheme Design and Teaching Practice academic record was 80.10 (SD = 3.740).

Moreover, the different scores before and after using PBL—to enhance the Music Teaching Scheme Design and Teaching Practice academic records—were examined. The results of this table show that after learning through problem-based learning (PBL) in the classroom, the post-test scores of students' Music Teaching Scheme Design and Teaching Practice academic records were greater than pre-test scores at .05 level of statistical significance (tdf = .000, p < .05). The average scores of the study increased more than those of the pre-test.

4.2 Results of assessing students' satisfaction on PBL

The results of comparing the different scores of students' satisfaction after learning through PBL with the criteria set at 70%. The table below shows the descriptive statistics and t-test as analyzed using the statistical package program. This table aims to answer the research objective of whether PBL could enhance students' satisfaction.

Table 3 Student satisfaction results table with the criteria set at 70%

Group	N	Full score	Criteria score	$\overline{\text{X}}$	S.D.	t	p
Experimental group	42	80	56	77.57	3.769	37.096	.000

As presented in Table 3, the mean scores of student satisfaction after learning through PBL were 77.57 out of a possible total score of 80, and the standard deviation was 3.796, which

was statistically higher than the criterion of 70% at a .05 level of statistical significance (t_{df} = .000, p < .05).

5. Discussion

5.1 PBL pedagogy can improve Music Teaching Scheme Design and Teaching Practice academic records for musicology students possibly due to the following two aspects: On the one hand, the PBL teaching method enables students to obtain knowledge and problem-solving skills in the form of groups, which transforms the traditional form of the teaching method, and pays attention to the combination of learning and thinking. Students can search, analyze, and collect data to increase their long-term memory of theoretical knowledge (Zhang, 2013). On the other hand, based on group cooperation to solve problems, PBL teaching encourages students to activate their existing knowledge, promotes the understanding of new information, and provides students with opportunities for independent thinking, organization, analysis, and exercising their ability of expression. Therefore, it is conducive for cultivating students' collective concept and team spirit, thereby improving their comprehensive quality.

5.2 PBL pedagogy enhances student satisfaction possibly because of the following aspects: First, the PBL teaching method is conducive to improving students' intrinsic interest and making the learning process more educational and enjoyable. The process of the group discussion in PBL pedagogy involves the relational process of building solidarity, collaboration, mutual support, and understanding; promoting more effective learning; and improving their ability to cooperate. Second, the evaluation system of the PBL teaching method permeates through the entire student learning process. In this practice, there are mutual evaluations among student groups and between teachers and students, along with formative and process evaluations. The PBL pedagogical evaluation system is conducive to comprehensive learning effectiveness for students, enabling them to learn through evaluation, evaluate through learning, and gain the recognition of other students.

6. Conclusion

6.1 This study analyzes and compares the pre-test and post-test scores of third-year university students who use PBL in the classroom. Finally, it shows that students' Music Teaching Scheme Design and Teaching Practice academic record after PBL is higher than that before learning.

6.2 This study assessed students' satisfaction with PBL using SPSS software. The results show that students' satisfaction toward Problem-Based Learning (PBL) method is at the high level.

7. Implications of the study

China's research on the application of the PBL teaching mode in the field of normal music is still in its infancy. Based on the existing research results in China, this study attempts to apply the PBL teaching mode to the teaching of normal music courses and initially forms a relatively complete and operable teaching process. On the one hand, it provides a new theoretical basis for teaching research on this course; on the other hand, it also provides new ideas for the development of a diversified teaching mode.

8. Recommendation for further research

8.1 The practice time for this implementation of the PBL teaching method was relatively short, and the number of lectures was limited. To better test the effect of PBL on cultivating students, excellent music teachers need to use PBL teaching strategies in the classroom for a longer time to conduct more effective empirical research in the future (Dai, 2017).

8.2 This research is limited by my academic level and external resource constraints; hence, the exploration of PBL teaching methods still has some shortcomings that need to be deeply explored and tried in the later stage. A school cannot represent all ordinary institutions of higher learning; hence, the PBL teaching method still needs to be verified in more ordinary institutions of higher learning to allow the results of the experiment to be more convincing (Wang, 2020).

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