Journal of Ecohumanism
2024
Volume: 3, No: 8, pp. 11594 – 11607
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v3i8.5761

Enhancing Pedagogical Content Knowledge and Motivation in Pre-Service Music Teachers: Efficacy of the BMT-PCK Training Module

Chuanxing Jiang[1], Nor Asniza Ishak[2]

Abstract

Pedagogical Content Knowledge is pivotal in music education, bridging content expertise and pedagogical skills to enhance teaching efficacy and student learning outcomes. This study combines basic music theory with PCK, and uses the ADDIE model to design a BMT-PCK training module for pre-service music teachers. This module is designed to improve pre-service music teachers' pedagogical knowledge, content knowledge, instructional strategies, and teaching motivation. The participants were 40 pre-service music teachers preparing for work in Hunan Province, China, assessing changes through pre- and post-intervention tests and surveys. The tests for assessing pedagogical knowledge and content knowledge gains. Surveys, based on validated scales, measure shifts in teaching motivation and effectiveness. Findings indicate significant improvements in participants' pedagogical understanding, content knowledge, and motivational levels. These results demonstrate the effectiveness of the BMT-PCK module in enhancing the competence of pre-service music teachers and provide a scalable model for future pre-service music teacher training programs.

Keywords: *BMT-PCK Module, Pedagogical Content Knowledge, Pre-service music teacher, Teaching Motivation.*

Introduction

In recent decades, the development of teachers' professional knowledge, particularly Pedagogical Content Knowledge (PCK), has gained significant prominence within the educational research domain (Shulman, 1986; Gess-Newsome, 2000; Berry, 2012; Park, 2017; Ayuningtyas, 2019; Wang & Zhang, 2022). PCK represents a sophisticated blend of content and pedagogy that is uniquely tailored to the teaching of specific content areas, making it a vital component of effective teaching strategies (Van Driel & Berry, 2012). The enhancement of PCK is seen as instrumental in enabling teachers to engage students more effectively in the learning process (Cochran, 1993; Park & Oliver, 2017).

Basic Music Theory (BMT) is a foundational course in music education that provides students with the essential principles and concepts of music. The course typically covers a wide range of topics, including the fundamentals of pitch, rhythm, harmony, notation, scales, intervals, chords, and key signatures. Students are introduced to the basic elements that make up musical compositions and learn how to read and write music（Jones, 2022).

However, the exploration of PCK within the realm of BMT has been relatively sparse (Singer et al., 2016). This gap in research underscores the need for innovative approaches to the professional development of pre-service music teachers, which led to the creation of the Basic Music Theory under Pedagogical Content Knowledge (BMT-PCK) training module. This module is a pioneering endeavour that seeks to amalgamate the foundational elements of PCK with an intensive focus on Basic Music Theory (BMT), aiming to equip pre-service music teachers with the necessary tools to navigate the complexities of the teaching environment, acquire pertinent knowledge, manage classroom dynamics effectively, and consequently, enhance their instructional efficacy.

The inception of the BMT-PCK module as an independent variable in this study is based on the necessity to provide pre-service music teachers with a comprehensive combination of pedagogical knowledge, content knowledge, and teaching motivation. By embedding PCK principles within the context of music education, the BMT-PCK module aims to bridge the gap between theoretical musical pedagogies and their

[1] School of Educational Studies, Universiti Sains Malaysia, 11800, Penang, Malaysia, Email: jiangchuanxing@student.usm.my
[2] School of Educational Studies, Universiti Sains Malaysia, 11800, Penang, Malaysia, Email： asnizaishak@usm.my, (Corresponding Author)

Journal of Ecohumanism
2024
Volume: 3, No: 8, pp. 11594 – 11607
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v3i8.5761

practical application in teaching scenarios.

The Global Importance of PCK in Music Education

The significance of Pedagogical Content Knowledge (PCK) in music education is gaining global recognition, as it effectively bridges the gap between a teacher's expertise in music content and their teaching ability. Shulman's foundational work on PCK underscores its critical role in fostering effective teaching across various disciplines, including music (Shulman, 1987). This concept has been expanded upon in music education by scholars like Nielsen, who emphasize the need for a harmonious balance between deep musical knowledge and strong pedagogical skills (Nielsen, 2023).

Moreover, the global trend towards student-centered learning in music education resonates with the principles underlying the BMT-PCK module. Researchers such as Jorgensen (2003) advocate for a transition from traditional, teacher-centered approaches to more student-centered methods, where the interests and experiences of students play a central role in the learning process. This shift necessitates that teachers possess both content expertise and pedagogical strategies that enhance student engagement and creativity.

The Current Knowledge of Pre-service Music Teachers and Service Music Teachers Situation in China

Research indicates that music education in China has been undergoing significant reforms, particularly with the increasing emphasis on quality education and the integration of global teaching methodologies (Yang, 2022). However, there are challenges related to the varying levels of training and expertise among teachers (Ramirez, 2020). Pre-service teachers, often fresh graduates, may lack practical teaching experience and in-depth knowledge of innovative teaching methods. In contrast, in-service teachers, despite having more experience, might face challenges in adapting to new educational reforms and technologies (Tunjera, 2019). According to Hibbs (2024) educator preparation programs should be strategically embed social-emotional learning into teacher education programs. This disparity suggests a need for continuous professional development and training programs that address both theoretical knowledge and practical skills, aligning with global standards while preserving the unique aspects of Chinese music education.

Pedagogical Content Knowledge and Teaching Motivation in Music Education

In music education, Pedagogical Content Knowledge (PCK) and teaching motivation are essential for effective instruction. PCK involves transforming a teacher's understanding of music content into accessible and pedagogically sound forms, while motivation drives the teacher's commitment and enthusiasm.

Knowledge of Music Content and Pedagogy

Music teachers must have a deep understanding of music theory, history, culture, performance techniques, and composition, as well as the pedagogical strategies that make this content accessible to learners. This includes knowledge of teaching approaches like Kodály, Orff, and Dalcroze, effective lesson planning, classroom management, and adapting methods to diverse learning styles and abilities (Ball, Thames, & Phelps, 2008; Grossman, 1990).

Teaching Motivation

Motivation in music teaching includes both intrinsic and extrinsic factors. Intrinsic motivation stems from a passion for music and teaching, providing joy in sharing knowledge and witnessing student growth. Extrinsic motivation includes external rewards such as recognition and career advancement, which complement intrinsic drives (Ryan & Deci, 2000).

By integrating robust content knowledge, effective pedagogical strategies, and strong teaching motivation, music educators can create engaging and successful learning experiences for their students.

Journal of Ecohumanism
2024
Volume: 3, No: 8, pp. 11594 – 11607
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v3i8.5761

The Need for a BMT-PCK Module

The imperative for a BMT-PCK Module in the landscape of teacher education within China is underscored by the evolving standards of teacher preparation. The BMT-PCK Module, rooted in the concept of Pedagogical Content Knowledge (PCK), proposes a solution to bridge these gaps. This module not only aims to refine educators' pedagogical insights and content expertise but also seeks to invigorate their passion for teaching, thereby potentially elevating the calibre of music instruction across the nation.

This innovative training schema posits a dual focus: enriching educators' comprehension of musical theory and pedagogy and bolstering their instructional methodologies tailored to student learning. The essence of PCK—merging disciplinary knowledge with teaching strategies—is at the core of the BMT-PCK Module. Such an approach promises to deepen music teachers' grasp of the subject matter and pedagogical techniques. Moreover, by fostering a positive teaching outlook and self-assurance among educators, the module catalyzes intrinsic motivation, as discussed by Nauman Ahmed, Pasha, & Malik (2021).

The BMT-PCK module's comprehensive content coverage, methodology training, and practical application exercises aim to enhance both pedagogical and content knowledge among pre-service music teachers, thereby improving teacher efficacy, content delivery, and student engagement in music theory education.

The main purpose of this study is to explore whether the BMT-PCK training module has an impact on the teaching knowledge, content knowledge and teaching motivation of pre-service music teachers in Hunan Province, China. Therefore, we formulated the following research questions:

RQ1. Is there any effect of the BMT-PCK training module on pre-service music teachers' Pedagogical Knowledge (PK) in teaching music subjects in Huna province, China？

Hypotheses 1. There is no significant effect on pre-service music teachers' Pedagogical Knowledge (PK) in teaching music subjects between the experimental group and the control group after the implementation of different training modules (BMT-PCK training module in the experimental group and ordinary training module in the control group) while controlling their pre-test scores.

RQ2. Is there any effect of the BMT-PCK training module on pre-service music teachers' Content Knowledge (CK) in teaching music subjects in Huna province, China？

Hypotheses 2. There is no significant effect on pre-service music teachers' Content Knowledge (CK) in teaching music subjects between the experimental group and the control group after the implementation of different training modules (BMT-PCK training module in the experimental group and ordinary training module in the control group) while controlling their pre-test scores.

RQ3. Is there any effect of the BMT-PCK training module on pre-service music teachers' motivation in teaching music subjects in Huna province, China？

Hypotheses 3. There is no significant effect on pre-service music teachers' teaching motivation in teaching music subjects between the experimental group and the control group after the implementation of different training modules (BMT-PCK training module in the experimental group and ordinary training module in the control group) while controlling their pre-test scores.

Literature Review

Pedagogical Content Knowledge (PCK)

PCK is a concept in pedagogy that refers to a teacher's ability to integrate subject knowledge with effective teaching strategies. Shulman(1986) introduces the concept of PCK, believing that PCK is the knowledge possessed by teachers, which enables them to combine the subject knowledge with the knowledge of how

Journal of Ecohumanism
2024
Volume: 3, No: 8, pp. 11594 – 11607
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v3i8.5761

to teach the subject effectively. In this study, PCK, as a framework for basic music theory, aims to give pre-service music teachers a comprehensive understanding of music theory and pedagogy in the context of music education. By providing them with pedagogical knowledge and content knowledge through the BMT-PCK training module, the teaching motivation and teaching confidence of pre-service music teachers are enhanced, ultimately promoting more engaging classrooms and more effective teaching practices.

Self-Determination Theory (SDT)

The significance of intrinsic motivation in music education is supported by Deci and Ryan's Self-Determination Theory (SDT), which posits that individuals are more motivated to learn and perform well when their activities are aligned with their interests and values (Ryan & Deci, 2000). In music, this means providing students with opportunities to explore diverse musical genres, participate in creative composition and improvisation, and perform in a supportive environment that values their unique contributions.

Constructivism in the BMT-PCK Module

Constructivism, rooted in the works of Jean Piaget (1952) and Lev Vygotsky (1978), emphasizes the active role of learners in constructing their own knowledge through interactions with their environment and others. This educational theory is particularly relevant to the BMT-PCK module, which aims to enhance the pedagogical content knowledge of pre-service music teachers by actively engaging them in learning processes that reflect constructivist principles.

The ADDIE Model of Module Development

The ADDIE model, a cornerstone in instructional design, provides a systematic approach to the development, implementation, and evaluation of educational programs. It encompasses five stages: Analysis, Design, Development, Implementation, and Evaluation. This model ensures the quality and effectiveness of teaching activities by adapting to the specific needs and contexts of educational projects (Branch, 2009). The structure of the BMT-PCK module was developed according to the theoretical framework of the ADDIE model of module development.

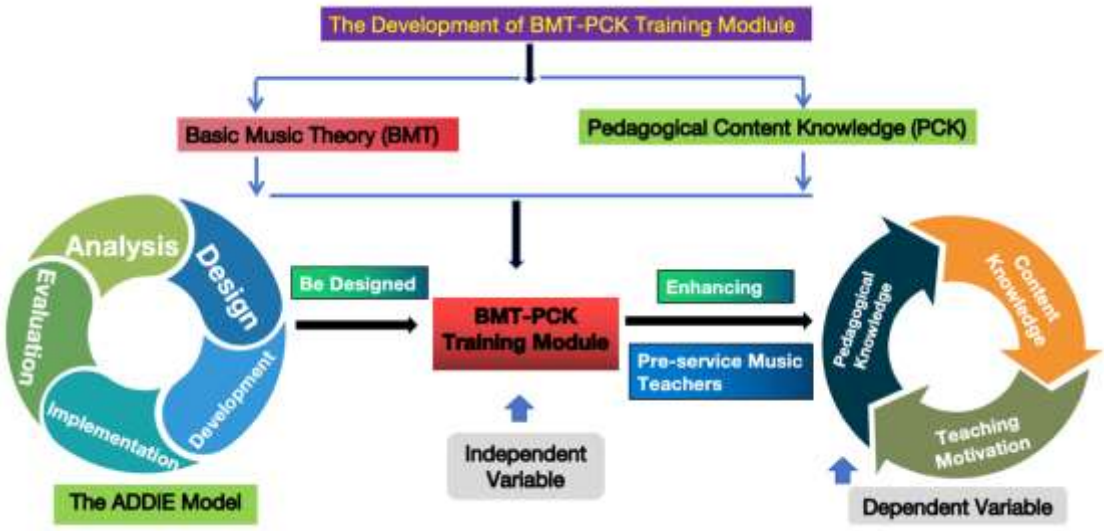

Figure 1. Conceptual Framework

Journal of Ecohumanism
2024
Volume: 3, No: 8, pp. 11594 – 11607
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v3i8.5761

Methodology

Quantitative Research Methods

This study employs quantitative methods to objectively assess the effectiveness of the Basic Music Theory under the BMT-PCK module. Consistent with Lazaraton's (2005) emphasis on systematic measurement, this approach provides a broad understanding of the module's impact on pre-service music teachers' PK), CK and Teaching motivations.

The study incorporates standardized tests for assessing BMT and PCK knowledge gains. Surveys, based on validated scales (Field, 2013), measure shifts in teaching motivation. These instruments are carefully selected to align with the study's objectives and ensure comprehensive data collection.

Then, data from tests and surveys will be statistically analysed. T-tests will compare pre- and post-module scores to assess knowledge enhancement, while ANCOVA will identify significant differences and trends with co-variance while controlling pretest (Jamieson, 2004). This analysis aims to quantify the impact of the BMT-PCK module.

The quantitative analysis will provide insights into how the BMT-PCK module influences pre-service teachers' pedagogical and content knowledge and teaching motivation. These findings are expected to contribute significantly to the field of music teacher education, offering empirical evidence on the efficacy of the BMT-PCK module.

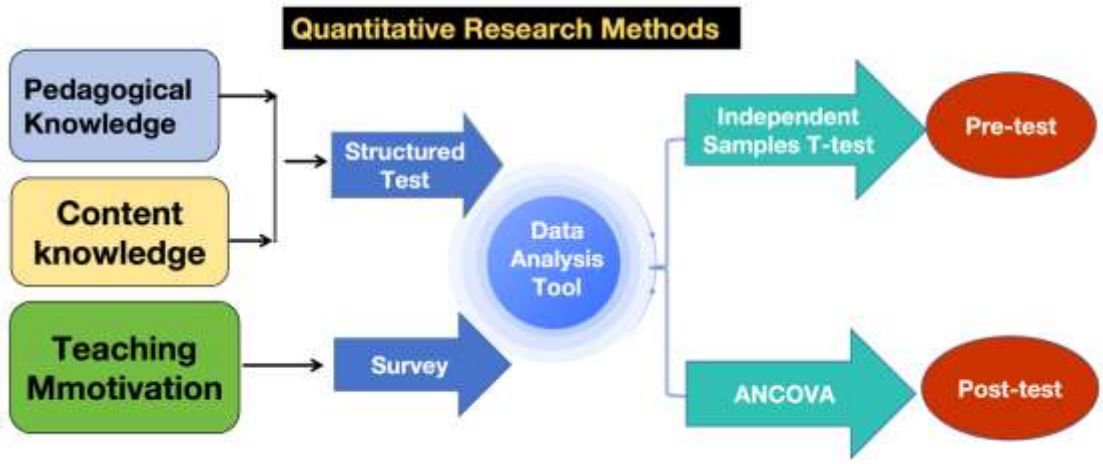

Figure 2. Research Method Design

Research Instruments

PK and CK Assessment

To align the assessment of PK and CK with the demands and objectives of the Basic Music Theory under the BMT-PCK module, the tests will be meticulously designed to evaluate the pre-service music teachers' knowledge and skills effectively. The design and structure of these assessments will be a hybrid approach, utilizing both the adaptation of existing tools and the creation of new items based on established educational research and theoretical frameworks.

Table 1. Research Instrument of PK and CK

	Question Type	No of Item
Pedagogical Knowledge	Multiple-choice	20
	True/False	20

Journal of Ecohumanism
2024
Volume: 3, No: 8, pp. 11594 – 11607
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v3i8.5761

Total		40
Content Knowledge	Multiple-choice	20
	True/False	20
Total		40

Motivation Survey

The motivation of pre-service music teachers will be assessed using a validated survey instrument that measures both intrinsic and extrinsic motivation. This survey will be based on the SDT as proposed by Ryan and Deci (2000), with a self-developed questionnaire tailored to the context of music education, includes 5-point Likert-scale questions designed to assess teachers' internal motivation to teach music and the external factors that influence their teaching practice. The reliability and validity of the questionnaire have been confirmed through a pilot study, ensuring that it meets the necessary standards for research use (Cronbach's Alpha=0.81>0.7).

Table 2. Reliability Statistics for Surveys on Teaching Motivation

Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	No of Items
0.81	0.81	30

Sample Selection

The pre-service music teachers participating in this study are 40 people who are preparing to work and develop in Hunan Province, China. These people come from different regions and universities in China and also cover different professional backgrounds, but they are 22-25 years old. After the participants were identified, the 40 people were randomly divided into the experimental group and the control group with 20 people in each group.

Table 3. Sample Characteristics and Grouping

Characteristic	Range/Description
Age	22 to 25 years (Final-year undergraduate students)
Gender Distribution	50% Female, 50% Male
Educational Background	Specializing in Music Education
Profession	Vocal, Instrumental, Music theory
Grouping	Experimental Group: 20 People
	Control Group:20 People

The Tool of Data Analysis

The quantitative data collected through pre-and post-tests, and motivation surveys will be analyzed using a range of statistical methods to assess the effectiveness of the BMT-PCK training module which uses Independent samples T-test and ANCOVA. T-test will be utilized to analyze the pre-test scores of PK, CK, and motivation. And ANCOVA will be utilized to analyze the post-test scores, and using the pre-test scores as covariates.

Data Analysis and Results

Data Collection of Pre-test Score of PK, CK and Motivation

In this study, we selected 40 pre-service music teachers as sample subjects. These participants come from different universities in China, but they are all ready to work in Hunan Province. The participants' music education background, age, gender and cultural background are diverse, representing a broad group of pre-service music teachers.

Journal of Ecohumanism
2024
Volume: 3, No: 8, pp. 11594 – 11607
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v3i8.5761

In the quantitative study, we divided these 40 participants into two groups of 20 and used the Independent Samples T-test and ANCOVA analysis to compare scores before and after the module intervention and to identify significant differences between different groups. The selection and allocation of these samples are designed to ensure the accuracy and credibility of the research results, thus providing a valuable reference for practice in the field of music education.

The whole data collection is divided into the pre-test phase, BMT-PCK module intervention phase and post-test phase. In the intervention phase, the experimental group used the BMT-PCK module for intervention, and the control group used the traditional training method for intervention.

Table 4. Intervention Phase

Groups	Intervention Method
Experimental Group	BMT-PCK training module
Control Group	Traditional teaching method

First, we conducted pre-test PK, CK, and teaching motivation test on 40 participants. After the test, we randomly assigned all the participants to the experimental group and the control group, 20 people each.

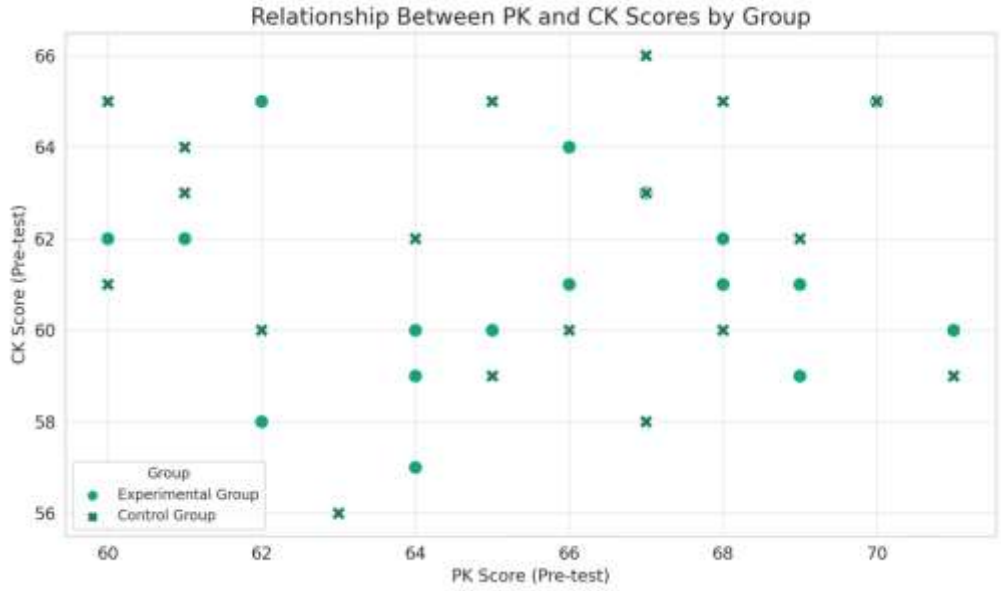

Figure 3. The Pre-test Score of PK and CK by Group.

Journal of Ecohumanism
2024
Volume: 3, No: 8, pp. 11594 – 11607
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v3i8.5761

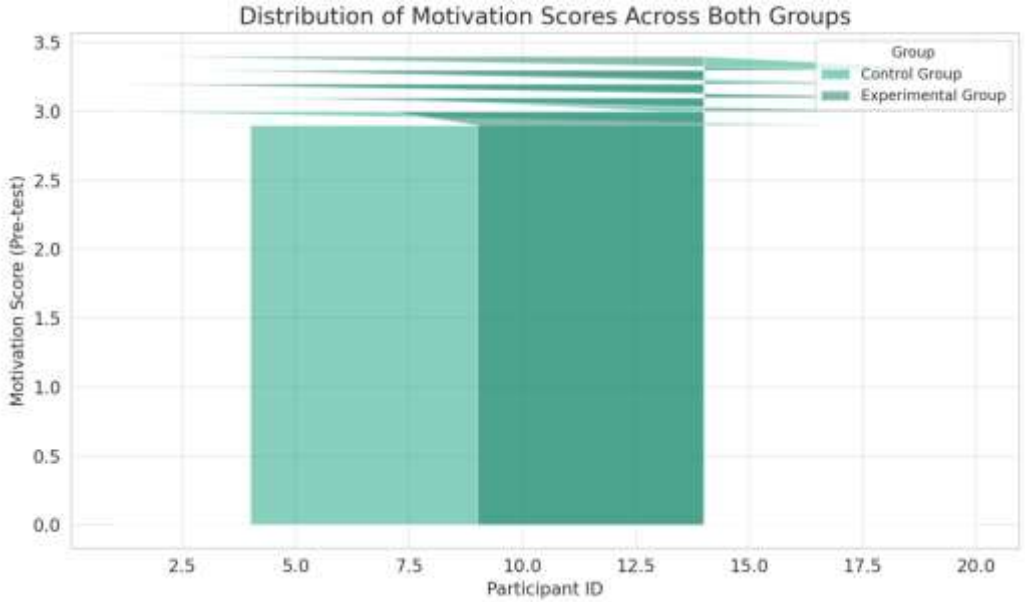

Figure 4. The Pre-test Score of Motivation by Group

According to the tabular data, the experimental group has a slightly higher average PK score (65.95) compared to the control group (65.20). The average CK scores are close, with the control group slightly higher (61.65) than the experimental group (61.30). The average motivation scores are nearly identical between the groups, with the experimental group averaging 3.14 and the control group 3.10. These statistics suggest that both groups are relatively similar in terms of pedagogical knowledge, content knowledge, and motivation levels before the BMT-PCK training module interventions.

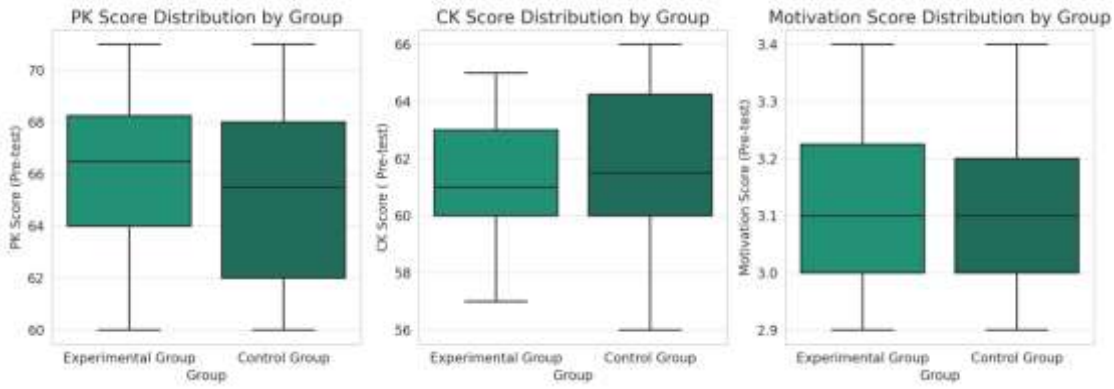

Figure 5. The Comparison of Pre-test Scores by Group

Data Analysis of Pre-test Score of PK, CK and Motivation

Descriptive Statistic for Pre-test Score

First, we conducted descriptive statistics on the pre-test scores of PK, CK and Motivation collected.

Table 5. Descriptive Statistics for Pre-test Score of Experimental Group

Experimental Group	N	Mean	Std.Deviation	Variance
PK Score	20	65.95	3.120	9.734
CK Score	20	61.30	2.179	4.747

Journal of Ecohumanism
2024
Volume: 3, No: 8, pp. 11594 – 11607
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v3i8.5761

Motivation Score	20	3.145	.143	.020

Table 6. Descriptive Statistics for Pre-test Score of Control Group

Experimental Group	N	Mean	Std.Deviation	Variance
PK Score	20	65.20	3.412	11.642
CK Score	20	61.65	2.777	7.713
Motivation Score	20	3.105	.143	.021

In the pre-test phase, both the experimental and control groups showed comparable scores across Pedagogical Knowledge (PK), Content Knowledge (CK), and Motivation. The experimental group had PK, CK, and Motivation average scores of 65.95 (SD = 3.120, Variance = 9.734), 61.30 (SD = 2.179, Variance = 4.747), and 3.145 (SD = 0.1432, Variance = 0.020) respectively. Similarly, the control group's averages were 65.20 (SD = 3.412, Variance = 11.642) for PK, 61.65 (SD = 2.777, Variance = 7.713) for CK, and 3.105 (SD = 0.1432, Variance = 0.021) for Motivation. This proved that there was no significant difference between the experimental group and the control group, and subsequent studies could be carried out smoothly.

Test of Normality for Pre-test Score

Next, we conducted a normality analysis of the pre-test scores of the experimental group and the control group.

Table 7. Test of Normality for Pre-test Score of Experimental Group

Test of Normality			
Experimental Group	Shapiro-Wilk		
	Statistic	df	p
PK Score	.945	20	.300
CK Score	.944	20	.289
Motivation Score	.938	20	.216

This is a lower bound of the true significance.

Lilliefors Significance Correction

Table 8. Test of Normality for Pre-test Score of Control Group

Test of Normality			
Control Group	Shapiro-Wilk		
	Statistic	df	p
PK Score	.945	20	.300
CK Score	.944	20	.289
Motivation Score	.938	20	.216

*. This is a lower bound of the true significance.

Journal of Ecohumanism
2024
Volume: 3, No: 8, pp. 11594 – 11607
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v3i8.5761

Lilliefors Significance Correction

The data in the chart show that no matter in the experimental group or the control group, the p values of pre-test scores in PK, CK and Motivation are significantly greater than the significance level (>0.05), that is, the normal test results of the three aspects of the experimental group and the control group all conform to the normal distribution. The results of the normality test show that the statistical method based on normal distribution can be used in the subsequent data analysis.

Table 9. Independent Samples T-test of Pre-test Score

		Levene's Test for Equality of Variances		T-test for Equality of Means				
		F	*p*	t	df	Sig	Mean	Std. error
PK Pre-test Score	Equal variances assumed	.508	.481	.393	38	.697	.409	1.040
	Equal variances not assumed			.395	37.99	.695	.409	1.035
CK Pre-test Score	Equal variances assumed	2.450	.126	-.130	38	.897	-.103	.792
	Equal variances not assumed			-.131	37.27	.896	-.103	.783
Motivation Pre-test Score	Equal variances assumed	.274	.604	.941	38	.353	.043	.045
	Equal variances not assumed			.939	37.14	.354	.043	.045

PK Pre-test Score : Levene's Test yielded an F value of 0.508 with a p value of 0.481, which is greater than 0.05. This indicates that the assumption of equal variances holds. Assuming equal variances, the T value is 0.393 with 38 degrees of freedom, and the corresponding P value is 0.697, which is greater than 0.05. This suggests that there is no significant difference between the groups' scores.

CK Pre-test Score : Levene's Test yielded an F value of 2.450 with a p value of 0.126, which is greater than 0.05. This indicates that the assumption of equal variances holds. Assuming equal variances, the T value is -0.130 with 38 degrees of freedom, and the corresponding P value is 0.897, which is greater than 0.05. This suggests that there is no significant difference between the groups' scores.

Motivation Pre-test Score : Levene's Test yielded an F value of 0.274 with a P value of 0.604, which is greater than 0.05. This indicates that the assumption of equal variances holds. Assuming equal variances, the T value is 0.941 with 38 degrees of freedom, and the corresponding p value is 0.353, which is greater than 0.05. This suggests that there is no significant difference between the groups' scores.

In summary, the results of the Independent Samples T-test for PK Pre-test Score, CK Pre-test Score, and Motivation Pre-test Score show no significant differences between the groups (all p values are greater than 0.05). This indicates that there are no statistically significant differences in the Pre-test scores among the groups in these three areas.

Data Collection of Post-test Score of PK, CK and Motivation

After the educational experiment intervention, we conducted a post-test on the experimental group and the control group and collected the post-test scores of the two groups.

Journal of Ecohumanism
2024
Volume: 3, No: 8, pp. 11594 – 11607
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v3i8.5761

The average post-test scores of the Experimental Group are PK Score: 84.25, CK Score: 82.20, and Motivation Score: 4.35. The average post-test scores of the Control Group are: PK Score: 67.90, CK Score: 67.00, Motivation Score: 3.25.

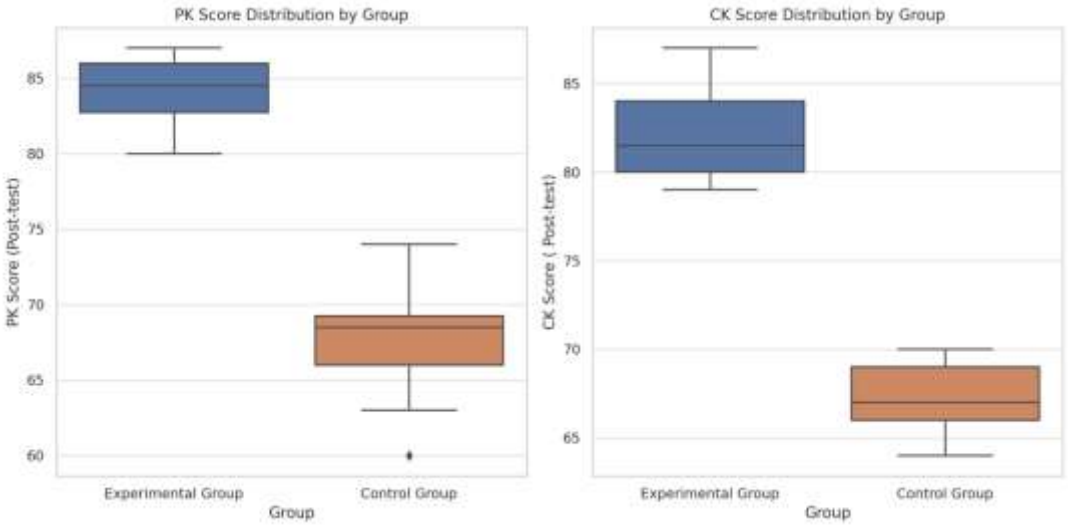

Figure 6. The Post-test Score of PK and CK by Group

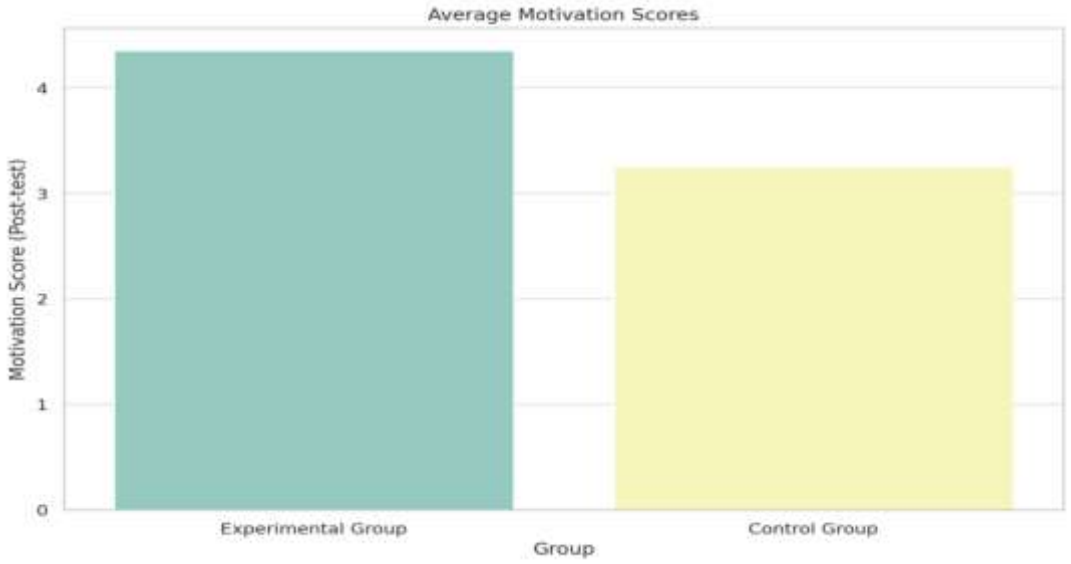

Figure 7. The Post-test Score of Motivation by Group.

Data Analysis of Post-test Score of PK, CK and Motivation

According to the data graph above, the Experimental Group significantly outperforms the Control Group in all metrics. This group shows notably higher averages in both Pedagogical Knowledge (PK) and Content Knowledge (CK) scores, as well as in Motivation Scores. Next, we used SPSS to analyse the post-test scores. Our analysis tool was ANCOVA, and the pre-test scores were taken as covariables.

Before ANCOVA analysis, descriptive statistics and normal analysis were performed on the post-test scores of both the experimental group and the control group, and the data structure was consistent with normal distribution.

Journal of Ecohumanism
2024
Volume: 3, No: 8, pp. 11594 – 11607
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v3i8.5761

Table 10. ANCOVA Analysis of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	F	p
Intercept	PK Score(Post-Test)	110.818	1	17.613	<.001
	CK Score(Post-Test)	86.111	1	21.728	<.001
	Motivation Score(Post-Test)	.072	1	6.114	.018

For the PK Score, the type III sum of squares is 110.818, indicating a significant relationship between changes in the PK Score and the independent or covariate when controlling for other factors. An F-value of 17.613 and a p-value of less than 0.001 indicate that the relationship is significant, we can reject the null hypothesis 1.

For CK Score, the type III sum of squares is 86.111, which means that there is a significant relationship between the change of CK Score and the independent variable or covariate when other factors are controlled. An F-value of 21.728 and a p-value of less than 0.001 indicate that the relationship is significant, we can reject the null hypothesis 2.

For the Motivation Score, the Type III sum of squares is 0.072, which means that there is a significant relationship between the change in Motivation Score and the independent variable or covariate when other factors are controlled. The F-value of 6.114 and the p-value of 0.018 indicate that the relationship is statistically significant, but the level of significance is relatively low, but we also can reject the null hypothesis 3.

Discussion

The purpose of this study was to explore the effectiveness of the Basic Music Theory (BMT-PCK) training module on improving the teaching knowledge (PK), content knowledge (CK) and teaching motivation of pre-service music teachers in Hunan Province.

Before the educational experiment intervention, the results of the experimental group were almost the same as those of the control group, and there was no significant difference. However, after the educational intervention experiment, the scores of the experimental group improved significantly after the PK and CK tests, which proved the effectiveness of the BMT-PCK module, and also verified that it was consistent with the theoretical basis of PCK, which emphasized the importance of combining content knowledge with teaching understanding to improve teaching efficiency (Shulman, 1986).

The success of the BMT-PCK module is also related to the use of the ADDIE model, as the ADDIE model provides a systematic approach to curriculum development and instructional design, and designs unique programs for the needs of pre-service music teachers. Secondly, the increase in teaching motivation of the experimental group further verified the effectiveness of the BMT-PCK module. This proves that BMT-PCK not only focuses on improving pedagogical knowledge and content knowledge but also on teacher motivation, which is crucial to maintaining teacher engagement and effectiveness in the long run. There is a significant relationship between module intervention and the improvement of motivation scores, indicating that integrating intrinsic and extrinsic motivation factors in training modules can train pre-service music teachers to become qualified music teachers.

The results of this study have far-reaching significance for the design and implementation of teacher education training programs, especially in the field of music education. The combination of basic music theory with PCK represents the emergence of a nuanced approach to teacher training to bridge the gap between theoretical knowledge and practical teaching skills. In addition, the positive impact on teaching motivation highlights the importance of addressing the motivational aspect in teacher training programs, which undoubtedly has positive and beneficial implications for music teacher education.

Journal of Ecohumanism
2024
Volume: 3, No: 8, pp. 11594 – 11607
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v3i8.5761

While this study provides valuable insights into the effectiveness of the BMT-PCK training module, it also has certain limitations. For example, although the sample size is sufficient for the statistical analysis of this study, there are certain limitations on the universality of the research results. Future studies could replicate the study with a larger, more diverse sample to enhance the generalisability of the results. In addition, the study focuses on pre-service music teachers in Hunan Province, which requires more participation and discussion by people from different cultural backgrounds and regions in a country as large as China, to explore the applicability and effectiveness of this module in different environments in future.

Conclusion

The BMT-PCK training module represents a significant advance in the field of receiving teacher training for pre-service music teachers, demonstrating the potential to improve pedagogical and content knowledge as well as teaching motivation among pre-service music teachers. This study will contribute to the comprehensive and comprehensive literature system of teacher training programs, strive to provide a broader and more positive impact on training practices, and find more efficient strategies to cope with new developments, new problems and new challenges in the field of music education.

References

Ayuningtyas, A. D., & Apriandi, D. (2019). Pedagogical content knowledge (PCK) pada mahasiswa calon guru matematika. Numerical: Jurnal Matematika dan Pendidikan Matematika, 3(2), 119-130. https://doi.org/10.25217/numerical.v3i2.681

Ballantyne, J., & Packer, J. (2004). Effectiveness of preservice music teacher education programs: Perceptions of early-career music teachers. Music Education Research, 6(3), 299-312. https://doi.org/10.1080/1461380042000281749

Branch, R. M. (2009). Instructional design: The ADDIE approach (Vol. 722). New York: Springer.

Cochran, K. F., DeRuiter, J. A., & King, R. A. (1993). Pedagogical content knowing: An integrative model for teacher preparation. Journal of Teacher Education, 44(4), 263-272. https://doi.org/10.1177/0022487193044004004

Cremades-Andreu, R. (2024). Introduction: New focuses in research in music education. Revista Española de Pedagogía, 82(287), 35.

Grossman, P. L. (1990). The making of a teacher: Teacher knowledge and teacher education. New York: Teachers College Press.

Gess-Newsome, J. (2000). Pedagogical content knowledge: An introduction and orientation. In J. Gess-Newsome & N. G. Lederman (Eds.), Examining pedagogical content knowledge (pp. 3-17). Kluwer Academic Publishers.

Field, A. (2013). Discovering statistics using IBM SPSS statistics (4th ed.). Sage.

Hibbs, B. (2024). Embedding social-emotional learning into pre-service ESOL teacher education. Studies in Educational Management, 16, 1-15. https://doi.org/10.32038/sem.2024.16.01

Hume, A., Cooper, R., & Borowski, A. (Eds.). (2019). Repositioning pedagogical content knowledge in teachers' knowledge for teaching science. Singapore: Springer Singapore.

Jones, C. S. (2022). Understanding basic music theory.

Jamieson, J. (2004). Analysis of covariance (ANCOVA) with difference scores. International Journal of Psychophysiology, 52(3), 277-283. https://doi.org/10.1016/j.ijpsycho.2003.12.009

Jorgensen, E. R. (2003). Transforming music education. Indiana University Press.

Loewenberg Ball, D., Thames, M. H., & Phelps, G. (2008). Content knowledge for teaching: What makes it special? Journal of Teacher Education, 59(5), 389-407. https://doi.org/10.1177/0022487108324554

Lazaraton, A. (2005). Quantitative research methods. In E. Hinkel (Ed.), Handbook of research in second language teaching and learning (pp. 209-224). Routledge.

Nielsen, S. G., Jordhus-Lier, A., & Karlsen, S. (2023). Selecting repertoire for music teaching: Findings from Norwegian schools of music and arts. Research Studies in Music Education, 45(1), 94-111. https://doi.org/10.1177/1321103X231156564

Nauman Ahmed, H., Pasha, A. R., & Malik, M. (2021). The Role of Teacher Training Programs in Optimizing Teacher Motivation and Professional Development Skills. Bulletin of Education and Research, 43(2), 17-37.

Park, S., & Chen, Y. C. (2017). Pedagogical content knowledge for teaching climate change. In Teaching Climate Change in the United States (pp. 67-84). Springer.

Ryan, R. M., & Deci, E. L. (2000). Intrinsic and extrinsic motivations: Classic definitions and new directions. Contemporary Educational Psychology, 25(1), 54-67. https://doi.org/10.1006/ceps.1999.1020

Ramirez, I. A. L. (2020). Pre-service teachers' perceived level of teaching skills. Journal of Education in Black Sea Region, 6(1), 97-109. https://doi.org/10.31578/jebs.v6i1.197

Shulman, L. S. (1986). Those who understand: Knowledge growth in teaching. Educational Researcher, 15(2), 4-14. https://doi.org/10.3102/0013189X015002004

Shulman, L. S. (1987). Knowledge and teaching: Foundations of the new reform. Harvard Educational Review, 57(1), 1-22. https://doi.org/10.17763/haer.57.1.j463w79r56455411

Journal of Ecohumanism
2024
Volume: 3, No: 8, pp. 11594 – 11607
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v3i8.5761

Singer, J., Marx, R. W., Krajcik, J., & Clay Chambers, J. (2016). Constructing extended inquiry projects: Curriculum materials for science education reform. Educational Psychologist, 51(3-4), 361-378. https://doi.org/10.1080/00461520.2016.1218137

Tunjera, N. (2019). Teacher Educators' Instructional Strategies in Preparing Pre-Service Teachers to Teach with Digital Technology in the 21st Century? Doctoral dissertation, Cape Peninsula University of Technology.

Van Driel, J. H., & Berry, A. (2012). Teacher professional development focusing on pedagogical content knowledge. Educational Researcher, 41(1), 26-28. https://doi.org/10.3102/0013189X11431010

Vygotsky, L. (1978). Mind in society: The development of higher psychological processes. Harvard University Press.

Wang, J., & Zhang, Y. (2022). Visualized Analysis of Domestic Papers on PCK (2000~2022). Hans Publishing House.

Yang, Y. (2022). Professional identity development of preservice music teachers: A survey study of three Chinese universities. Research Studies in Music Education, 44(2), 313-330. https://doi.org/10.1177/1321103X221107859