

# 예비 음악교사의 교수내용지식 및 자기효능감 발달에 미치는 동료멘토링의 영향

## The Influence of Peer Mentoring on the Development of Pedagogical Content Knowledge (PCK) and Teacher Self-efficacy of Pre-service Music Teachers

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### 요약

본 연구의 목적은 예비음악교사들의 교수내용지식(PCK) 및 교사의 자기효능감에 발달에 미치는 동료멘토링의 영향에 관한 연구이다. 37명의 예비음악교사들이 16주간 동료멘토링을 통해 수업지도안 작성 및 수업시연을 진행하였다. 예비음악교사들의 인터뷰와 성찰저널을 활용하여 PCK의 구성요소 '교수법지식', 표현지식, 내용지식, 교육과정지식, 평가지식, 학생지식, 환경상황지식 및 교사의 자기효능감에 대해 분석하였다. 반구조화된 인터뷰 내용과 성찰저널 분석은 질적연구의 '현상학적 경험 연구'방법에 제시된 절차에 따라 진행하였다. 인터뷰와 성찰저널 분석결과 예비음악교사들은 동료 멘토링을 통해 다양한 지식을 습득하고 수업지도안 작성 및 수업시연에 대해 자신감을 형성하였다. 이 과정에서 예비음악교사들은 자기주도적 학습을 통해 교사로서 자기 효능감이 향상되었다고 하였다. 이와 같은 결과를 통해 실질적인 수업시연 및 교수법에 대한 연구와 교수법 개발에 대한 다양한 기회가 제공되어야 함을 시사하고 있다.

■ 중심어 : | 예비 음악교사 | 교과교육학지식 | 교사의 자기효능감 | 동료 멘토링 |

### Abstract

This research investigates how pre-service music teachers demonstrated pedagogical content knowledge (PCK) and self-efficacy during a 16-week Music Education Course. 37 pre-service music teachers underwent peer mentoring, and prepared teaching guides and class teaching demonstrations. At the end of the course, the 37 participants' teacher self-efficacy and PCK components (namely pedagogical knowledge, representational knowledge, subject matter knowledge, assessment knowledge, student characteristics knowledge, curriculum knowledge, and context and social knowledge) were assessed. Data on their self-efficacy and PCK were gathered through a group interview and their self-reflection journals, and analyzed as phenomenological experience research. Analyses of the data show that pre-service music teachers acquired diverse knowledge. It also showed that peer mentoring enhanced the pre-service music teachers' self-efficacy, enabling them to prepare teaching guides and confidently demonstrate classes. Thus, diverse opportunities in research and practical class demonstrations contributed to pre-service music teachers' PCK and self-efficacy.

■ keyword : | Pre-service Music Teachers | Pedagogical Content Knowledge (PCK) | Teacher Self-efficacy | Peer Mentoring |

## I. Introduction

Teacher education in teacher training institutions such as colleges and graduate schools of education should ideally enable them to apply their acquired knowledge to students in the classroom. Pre-service teachers need to have pedagogical knowledge, as well as cultural and specialized knowledge in a variety of competency fields[1]. However, the training methodology of pre-service teachers has not changed with the times[2].

Pedagogical content knowledge (PCK hereafter) is crucial to the improvement of teachers' expertise, as it includes knowledge and material related to teaching and learning in schools such as textbook contents, students, school contexts, teaching methods and curriculums[3][4]. Pre-service teachers acquire pedagogical expertise and effective/reflective thinking through PCK. Accordingly, pre-service school teachers gain knowledge from various pedagogy-related curriculum subjects in the course of their training that they subsequently integrate into their teaching methods[5].

PCK was proposed by Shulman[6], and has come to influence research on teachers' construction of the theoretical knowledge system as well as their teaching methodologies and assessment[7]. Shulman stressed that teachers must be well-versed in the subject matter and have the knowledge to effectively teach it [6]. PCK enables teachers to apply the knowledge they have gained from diverse fields through complex/high-level cognition activities in the planning, preparation and instruction of their subjects. As performers of curricular/educational reformation, teachers need PCK to run successful classes that

effectively provide learners with a sound understanding of the subject matter.

Pre-service teacher education emphasizes the transposition of learned theory unto students. Most colleges and graduate schools of education train pre-service teachers through theories[8], and instill PCK through educational practices and activities[5]. Rusznyak and Walton stress the enhancement of PCK through lesson planning guidelines in teachers' educational activities[9]. As pre-service teachers can use the complicated interaction with PCK components to systematically plan their classes, these lesson planning guidelines would improve their PCK. Pre-service teachers can use PCK to apply the knowledge acquired through their education and training in the classroom.

Grossman investigated the ways through which teachers drew on pedagogical knowledge and subject matter knowledge[10]. Choe and Hwang explored the influence of context and social knowledge on educators' teaching behavior[11]. This study builds on their research by analyzing knowledge bases in teaching activities. Peer mentoring can also enhance PCK. Mentoring is the intentional teaming of students so that students with less experience and skills can learn from those with more; in so doing, these inexperienced students would be able to achieve their goals[12]. Peer mentoring among teachers is a mutual sharing of conversations on their students and classes[46]. Teachers or pre-service teachers with more experience serve as mentors, while less experienced teachers are mentees[13]. Through their mentors' counsel, mentees' attitudes and characters as teachers will develop. Therefore, peer mentoring effectively allows peers to exchange and practice PCK. This study

considers the PCK effects of pre-service teacher mentors with teaching experience in music education on pre-service teacher mentees with no experience.

Music pedagogy classes comprise content delivery and practical practice (such as singing and playing musical instruments). The Korean department of music education suggests pre-service teachers hold teaching demonstration classes to gain knowledge on constructing practice-based classes. Despite these practice-based class teaching demonstrations, pre-service music teachers in Korea still experience difficulties in constructing classes that balance theories and activities[14]. This is because they did not have any school teaching experience before attending graduate school. Class plans of school music teachers should therefore be constructed according to the curriculum. This would allow learners to acquire musical knowledge and skills, and contribute to the teachers' effective construction and management of music classes. Accordingly, pre-service music teachers must be educated on music pedagogy and acquire the know-how to prepare a systematic class plan.

In this research, pre-service teachers underwent a learning environment established in the essential Music Education Instructional Materials and Music Teaching Methods Course (hereinafter, Music Education Course) for music teachers. To study changes in PCK among pre-service teachers in the peer mentoring process, 1 or 2 pre-service teacher mentors with teaching experience in music education were put into a team with 2-3 mentees. The Music Education Course teaches participants to instruct the subject well in school by actively

constructing their knowledge through peer mentoring[15]. Through mentoring team activities, mentees learned how to better prepare teaching guides and successfully participate in school teaching practices. While preparing teaching guides and demonstrating classes as mentors/mentees, they applied diverse teaching methods. Additionally, mentors were able to transmit their experiences in practical teaching and review the music curriculum. By sharing their experiences and observing their mentees' class teaching demonstrations, mentors will be able to overcome their weaknesses.

Teacher self-efficacy also influences the teaching capacity of teachers. Teacher self-efficacy is the teachers' belief in their abilities to successfully run classes that will positively impact learners' academic achievements[16]. Teacher self-efficacy shapes teaching behavior, while qualitatively enhancing teaching ability and reforming the teacher's educational experience[17].

In this study, the pre-service music teachers' PCK and self-efficacy were analyzed. Following Tuan[18], 7 knowledge bases forming PCK were analyzed: pedagogical knowledge, representational knowledge, subject matter knowledge, assessment knowledge, student characteristics knowledge, curriculum knowledge, and context and social knowledge.

The analysis of pre-service music teachers' PCK in this study addressed two research questions:

- (1) Does peer mentoring enhance pre-service teachers' PCK?
- (2) Does peer mentoring enhance pre-service teachers' self-efficacy?

## II. Theoretical Background

### 1. Pedagogical Content Knowledge(PCK) in Music Education

PCK is knowledge on the theory and practice of the teaching-learning process, including the basic knowledge of the subject matter as well as the methods of teaching that subject[19]. Pedagogy comprises complex, creative and practical characteristics[20], and is reconstructed according to the subject matter as it is taught and learnt in the practical classroom environment.

Studies on PCK in the field of music education are scant. Although the expertise of teachers has been considerably explored through the existing literature on the teaching of music, there are few music teaching studies related to PCK. Existing writings on music education PCK are case studies dealing with specialized band directors' PCK vis-à-vis teaching their students to play lip slurs[21], elementary school music teachers' PCK in music creation classes[22], music teachers' musical/technical education and acquisition of contents knowledge[23], and PCK-based music teachers' appointment examination[24].

As music education is composed of theory-based and practice-based classes, music teachers have to utilize specialized music knowledge and pedagogical knowledge in their lessons. According to the Music Educators National Conference report on music teachers' expertise, music teachers ought to accurately express their philosophy on music and education, cope with the latest education trends, use their musical knowledge to facilitate the participation of learners with difficulties, and accept different types of music[25].

PCK studies on overseas music education mainly focus on teachers of musical instruments, analyses of PCK's influence on music education and the progress of instrumental music educators[26], and research on pre-service instrumental music teachers' PCK acquisition[27]. Millican[28] and Ballantyne [29], for example, demonstrate US music teachers' diverse PCK by considering pre-service teachers' awareness and use of PCK alongside their skills and specialized knowledge in lessons. These various studies underscored the reformation of music teacher education to develop PCK[30], thus highlighting its importance for music teachers.

PCK studies on music education in Korea analyze its development in music classes[31], determine its impact in shaping secondary music teachers' qualifications and roles[32], examine teachers' PCK according to the Jajinmori beat in Korean music[33], and outline PCK components that music teachers should develop for the reinforcement of teaching capacity and effective application of the curriculum[24].

### 2. Teacher self-efficacy

Self-efficacy is the belief in one's abilities to successfully complete a particular task[34]. It propels cognitive theory and behavioral change when efficacy expectation and outcome expectation are displayed in particular circumstances[34-36]. Teacher self-efficacy is the teachers' belief in their abilities to teach a specific subject[37]. It enables educators to develop their expertise as teachers[16].

Various studies have explored the development of teaching expertise through teacher self-efficacy. Gibson and Dembo

suggested the inclusion of teacher efficacy theory in teachers' education[16], while Chang, McKeachie and Lin used awareness and teacher efficacy to research the educational support of college educators in Taiwan[38]. The impact of teacher self-efficacy on students' academic achievements was also measured by Gencer and Cakiroglu[39].

There are two aspects to teacher self-efficacy: its impact on learners' academic achievements, and its effects on personal teaching efficacy [16]. Teacher self-efficacy directly influences actual teaching behavior to qualitatively enhance educators' teaching abilities[37]. Teachers with high self-efficacy are passionate about teaching, and have newly constructed educational capacities exerting strong influence over their confidence and their students' learning[40].

Existing literature on teaching efficacy in music education include studies on music teaching efficacy in early childhood education [40]; music teaching efficacy among elementary school music teachers and the impact on their teaching behavior[17]; the effects of the level of music teaching efficacy on music teaching efficacy[41]; the impact of pre-service string music teachers' society-based lab experiences on their teaching efficacy[42]; the influence of voice changes in the singing self-efficacy of adolescent males[43]; and the impact of pre-service teachers' preconceived attitudes, beliefs and self-efficacy vis-à-vis the integration of music in the elementary curriculum[44].

This study adds to the literature by examining the impact of peer mentoring on pre-service music teachers' PCK and teacher self-efficacy.

### III. Method

#### 1. Participants and Research Period

This case study centers on the Music Education Course in the graduate school of music education in Korea. This course is a prerequisite for students pursuing their teaching license. There were 37 participants (8 male and 29 female) in the 16-week course. All participants were music majors in college, and would obtain their teaching licenses upon the completion of their studies in the graduate school of education. Data on the participants' PCK and self-efficacy were collected through a group interview and their self-reflection journals. The group interview and self-reflection journals were used to collect specific data on the ways in which participants' PCK and self-efficacy were enhanced. Ten students volunteered to participate in the group interview conducted during the final session of the course. The interview lasted approximately 120 minutes, and was based on the author's semi-structured questions. The 10 interviewees are anonymously identified as student 1, student 2, and so on. All 37 students wrote self-reflection journals during the final class of the course. The 14 mentors and 23 mentees in the self-reflection journal exercise are anonymously identified as mentor 1, mentor 2, mentee 1, mentee 2, and so on.

#### 2. Instruments

The pre-service music teachers' PCK and teacher self-efficacy were analyzed in the group interview and self-reflection journals. Interview questions were semi-structured, and related to teacher self-efficacy and pedagogical content knowledge in the Music Education Course. The

37 self-reflection journals were analyzed according to the contents written by the mentors and mentees.

### 3. Explanation of the Music Education Instructional Materials and Music Teaching Methods Course

The Music Education Course educates pre-service music teachers on the application of various educational theories and teaching methods in the classroom. During the 16-week course, the pre-service teachers gained teaching expertise by preparing teaching guides, demonstrating classes, analyzing textbooks, and developing teaching materials. They also learnt about teaching methodologies, the impact of these methodologies on students' learning, and the music curriculum from the in-service teacher instructors. In so doing, these pre-service teachers gained PCK through their continuous team activities and instructor feedback on music subject matters. The pre-service music teachers also engaged in the following class activities:

- Preparation of teaching guides and Demonstration of classes:

To gain practical experience in developing teaching guides and demonstrating classes, each team of 4-5 pre-service teachers selected a subject matter for their mentor to teach. Each team comprised 2 mentors and 2-3 mentees. Mentors are students who had been trained in teaching by the professional teachers in the school for one month. They also had teaching experience. After the mentors shared their music education learning and teaching experiences, and the instructors provided feedback, the team would conduct discussions. The pre-service teacher mentees would then demonstrate classes, and receive feedback from the instructor and their peers.

- Class assessment by peer pre-service teachers:

The pre-service teachers' class teaching demonstrations were appraised by their peers in assessment sheets according to the 5-point Likert scale in the areas of facilitating understanding of the curriculum, teaching and learning methods, learners'

grasp of subject matters, teaching and learning strategies, introduction of classes, teacher's questioning, teacher's attitude, mutual relationship between teacher and students, use of learning data, class management, learning organization, lesson contents, assessment methods, and assessment results. Additionally, the strengths and weaknesses of those who demonstrated classes were assessed. At the end of the appraisal, the assessment sheets were issued to those who had demonstrated classes so that they could review their performance.

- Analysis of curricula/textbooks revised in 2009:

In their teams, the pre-service teachers examined the music curriculum to determine learning goals and teaching contents. The contents of music textbooks were analyzed according to the time it would take to teach them. Contents that would be used in the next class demonstration were also introduced and discussed. After observing each team's activities, the instructor then provided feedback.

- Self-reflection journals:

The pre-service teachers reviewed their teaching activities and class teaching demonstrations in their journals by evaluating class demonstration preparations and the ways that class teaching demonstrations could be improved. They also considered efficacious methods of imparting knowledge as teachers.

### 4. Data analysis

The interview data and self-reflection journal contents were categorized into main topics to aid analysis. The data collected from the interview and self-reflection journals were analyzed according to Colaizzi's phenomenological experience research[45]. First, before analyzing the collected material, the participant's statements were repeated several times. Second, research questions and their corresponding statements were categorized. Third, in-depth reading was used to define the categorized data as conceptual or interpretive. Fourth, the data were read repeatedly and constructed as a common theme. Fifth, PCK and self-efficacy of pre-service music teachers' in this class were categorized, and the major contents of each classification were described. Sixth, the results of the analyses were shared with the

participants by e-mail. Their comments were also used to confirm that there were no interpretation problems with the research results.

## IV. Results

To facilitate the interpretation of the research results, this section will be divided into subheadings according to the 7 PCK components. Concise details of the research results vis-à-vis the relevant PCK component will be described under each subheading.

### 1. PCK Changes

#### 1.1 Change in pedagogical knowledge

To investigate the causes of their enhanced pedagogical knowledge, 10 pre-service teachers were interviewed. Some of them attributed their improved pedagogical knowledge to the opportunity to review diverse teaching methods and teaching guides throughout the compulsory course:

I gained a number of ideas through the subject-converged demonstration classes (student 1).

Other pre-service teachers ascribed their increased know-how to the demonstration classes:

I was particularly impressed by the methods and teaching guides used by those teachers who majored in music pedagogy. By looking at their strengths, I've learnt how I can improve (student 2).

The group interview on the teaching methods shows that all 37 students in this study acquired and learnt to apply diverse teaching methods, thereby freeing them from the teaching methods previously learnt as music majors. The

self-reflection journal entries indicated the pre-service teachers' awareness of changes in their PCK. While preparing teaching guides and demonstrating classes as mentors/mentees, they explored diverse teaching methods. By sharing their experiences and reviewing their mentees' class teaching demonstrations, mentors were able to overcome their weaknesses:

I was able to look back on myself when I prepared for classes. Most importantly, I was able to pinpoint areas I needed to improve before becoming an in-service teacher. While monitoring the other teachers' class teaching demonstrations, I thought about ways to maximize my strengths and overcome my weaknesses. For example, our team presented a method to converge physical education and music. I found it difficult to prepare inclusive classes relating music to another subject, but the demonstration classes greatly helped us to conceptualize creative ideas (mentor 6).

When mentees prepared teaching guides and demonstration classes with their mentors' help, they presented their own views on learning and studying teaching methods:

From time to time, I think about how to run creative classes to attract students' interest and I shared these ideas with my team. ...I was able to expand on these ideas and successfully combine my classes with other subjects through my team members' feedback. Also, I was able to learn from my team members' creative ideas (mentee 2).

#### 1.2 Change in representational knowledge

Interviews revealed that pre-service teachers preferred the new methods of preparing diverse teaching guides and class teaching demonstrations to the standardized representations. They were especially struck by the co-management of practice and theory in their class teaching demonstrations.

Furthermore, they highlighted their experiences in selecting appropriate music for their class demonstration by noting that discussions with their team members contributed to their final choice. They sought out videos to attract learners' interest and researched ways of rewriting verses for selected songs. They were aware that they had to prepare and demonstrate classes to enable learners to easily understand their contents. They used supplemental data and descriptions to devise alternative teaching methods, thus enhancing their representational knowledge:

Since the classes are about music and physical education, they would require practice, appreciation and one-way lectures. I thought about using information and Communications Technologies (ICT) and educational technology to combine those aspects to make music interesting for children (student 5).

The self-reflection journal contents highlighted the different changes in their representational knowledge. The mentors' changes stemmed from their self-examination as they recounted past experiences in practical teaching to their mentees. The mentees' representational knowledge changed because they applied their mentors' advice and the input of team discussions in their class teaching demonstrations. Mentees also drew on their majors to devise ways for learners to enjoy the learning process:

I felt bad that the learning goal and my demonstration didn't quite match in the music appreciation classes... I had thought that applying diverse related knowledge to the music appreciation classes would keep learners from growing bored, but I saw how interesting videos could help attract learners' interest. I believe more learners would participate in

music lessons when the contents are similar to the music appreciation classes (mentor 13).

### 1.3 Change in subject matter knowledge

The interviewed pre-service teachers expressed the importance of textbooks in shaping the main contents and thematic concepts in their class preparation process. They also stated that their team members' discussions had contributed to the diverse contents of their class teaching demonstrations. This implies that pre-service teachers lacked knowledge of music-related instructional materials prior to the Music Education Course. The textbook analysis task in this course drove home the importance of instructional materials and taught the pre-service teachers to use them. In realizing the importance of instructional materials in the class preparation process, they enhanced their subject matter knowledge whilst learning about the subject matter:

Upon collecting all the notes on the class teaching demonstrations, I found that their contents varied. I was able to find my instructional materials from this multifarious collection. Reviewing the work of others made me think, and I now believe that learning would be limited if students were only taught in theory-based classes. This experience helped me a lot in this respect (student 5).

The self-reflection journal contents revealed that the mentors' enhanced subject matter knowledge sprang from their assistance to mentees in class demonstration preparations. This was because they had to present their knowledge and teaching experiences through team activities, and deliver this knowledge to mentees as music classes. To deliver this knowledge as class contents, they initiated studies and research whilst leading the preparation for class demonstrations. The



mentees expanded their subject matter knowledge through team discussions, interactions and sharing of knowledge:

I designed an impressionism music class as well as a drama music class and teaching guide by searching for topics where the art and music subjects were combined. I searched for the works of Monet, Degas and Pissarro, and studied them to collect art data. To match this data to music, I searched YouTube for videos that were suitable for teaching. I also studied the characteristics of opera and musicals to relate them to the design of my classes (mentee 10).

#### 1.4 Change in curriculum knowledge

The post-course survey interview of 10 pre-service teachers showed that their curriculum knowledge was enhanced. Class demonstration preparation and textbook analyses had the greatest influence in changing the participants' curriculum knowledge. The pre-service teacher interviewees said they did not know the constructs of the different elements of the music subject until they studied the curriculum as part of their class demonstration preparation and saw them reflected in the textbooks. The interviewed participants cultivated their curriculum knowledge through their understanding of the subject's curricular construction, main contents and concepts, as they prepared their class teaching demonstrations:

Before taking this course, I never thought about how the music subject was constructed. I didn't even think it could include the contents of the subjects in the 2009 revised curriculum. I gained an understanding of the elements in the music subject, the composition of these elements, the main contents and concepts of the music subject, and what needs to be prepared before I run my classes (student 3).

As indicated in their self-reflection journals, the pre-service teachers analyzed the curriculum and various textbooks to prepare their teaching guides. They then combined relevant parts from each book to prepare their class teaching demonstrations. They enhanced their curriculum knowledge by studying the music curriculum and analyzing subject-related instructional materials as they prepared their class teaching demonstrations:

Our team focused on multicultural/global citizenship from the 2009 revised curriculum... We investigated the trends in Korea's curriculums to conceptualize a measure that reconstructed this flow. Our team members agreed that multiculturalism was an important flow within the curriculums, and we decided to use that topic to develop the inclusive subject (mentor 8).

I realized that discussing and constructing the annual plan and outline helped shape subject-related teaching materials. I learnt the importance of setting and inclusively constructing educational goals and directions. By determining whether the matter is suitable for the reconstruction of subject-related material and whether it is applicable to the field, teachers can understand how the Ministry of Education sets the educational purpose and direction (mentee 11).

#### 1.5 Change in assessment knowledge

The pre-service teachers' assessment knowledge was determined by their experience in manufacturing questions for the formative evaluation of the music subject as well as the suitability of their assessment sheets in evaluating student learning. There was no noticeable change in the pre-service teachers' manufacturing of evaluation questions and learning evaluation sheets. This might be because the course participants had given private lessons as music majors or solved music workbooks as school instructors:

I understood how and why formative evaluation must be manufactured through the feedback provided after the class teaching demonstrations (student 3).

The course also enhanced the pre-service teachers' understanding of formative evaluation:

The class teaching demonstrations gave me the know-how to teach well. I then began thinking about evaluating my own music students in my music class. These class teaching demonstrations gave me some ideas on the questions I could formulate to evaluate my students' learning (student 5).

The pre-service teachers' self-reflection journals indicated their satisfaction with the evaluation methods that they used in their class demonstrations. They believed their evaluation methods could contribute significantly to improving the learners' understanding of the subject. By analyzing the current music textbooks, they also discovered that different evaluation methods were required for different activities.

#### 1.6 Change in student characteristics knowledge

The interview found no change in the pre-service teachers' student characteristics knowledge. It takes time and effort for both in-service and pre-service teachers to discover their individual students' characteristics, learning motives, learning styles, attitudes, and precedent knowledge. In this study, student characteristics knowledge was used to examine individual differences, precedent knowledge, difficulties, partnerships and attitudes among learners. As the participants in the class teaching demonstrations were not actual secondary school students, it was difficult to acquire student characteristics knowledge in

this study. However, the pre-service teachers were able to learn the importance of properly imparting knowledge to students:

I used to think the teacher's musical capacity was the most important. However, I now feel it is equally important to educate students well and continuously share feedback (student 7).

The pre-service teachers are aware of the importance of improving their student characteristics knowledge through communication with students and attracting their interest in the subject (mentor 9).

Indeed, these teachers used diverse data to run classes on interesting topics to make the subject interesting to students:

I saw that it is necessary to run classes appropriate to each level, and prepared class material to ensure no student is left behind (mentee 4).

#### 1.7 Change in context and social knowledge

Context and social knowledge is knowledge related to the interview participants' experiences in teaching practice, team activities with peers, and internet searches. The interactions and feedback shared through team activities during the course advanced their context and social knowledge. Advice from fellow pre-service teachers in class teaching demonstrations and interaction among team members also added to the participants' context and social knowledge:

We discovered our own strengths and weaknesses when we reviewed each other's class teaching demonstrations and shared feedback (student 7).

This shows that the pre-service teachers' context and social knowledge were developed through information sharing and the acquisition of experience. The participants'

self-reflection journals also acknowledged the importance of expertise acquisition in context and social knowledge. They expressed satisfaction with the ways in which the mentors and mentees in each team cooperated with one another in class demonstration preparations:

It was such a heavy burden to plan the outline of the units to be taught in classes throughout the entire semester. However, thanks to the mutual care of good team members, this subject became one of my favorites. I learnt a lot from exchanging opinions and cooperating in class demonstration preparations. I completed tasks that I couldn't have done without my team members (mentee 6).

## 2. Teacher self-efficacy

Firstly, the participants' believed their teacher self-efficacy would improve when they interacted with team members to prepare their classes, teaching guides and demonstrations. Indeed, they acquired and used diverse teaching methods instead of the pre-existing teaching methods in class teaching demonstrations. They explored the strengths of each teaching method and reviewed diverse class teaching demonstrations and teaching guides to determine which technique required improvement. They also studied instructional materials to prepare semester plans and teaching guides. Additionally, interactions with their team members gave the pre-service teachers the confidence to apply their musical knowledge to their classes. As a result, they actively prepared for their future as in-service teachers through demonstration classes and reviewing their peers' classes:

After hearing my team members' different opinions, I decided to use my musical knowledge. Good raw material must be made understandable to students,

even if it is difficult to do so. I learnt to devise ways of transmitting my knowledge to students, while studying the instructional materials (student 5).

This course is very useful to those without practical teaching experience. Although I was a mentor, I improved my teaching methods by reviewing the creative classes demonstrated by other teachers. I also learned a lot by reviewing various teaching guides. I was glad to receive feedback and direct evaluations on my strengths and areas where I could improve (student 7).

Secondly, the participants were also able to enhance their teacher self-efficacy by reflecting on the way they ran their class teaching demonstrations. These pre-service teachers' confidence was boosted by their peers' feedback after their class teaching demonstrations:

Feedback on my class demonstration provided insights on my strengths and weaknesses (student 5).

Through positive feedback, admitting their weaknesses and acknowledging areas of improvement, they gained the confidence to be better in-service teachers in the future. By accepting their peer pre-service teachers' feedback and vowing to refine their teaching methods, the participants' enhanced their teacher self-efficacy:

The feedback on my initial class demonstration contributed to my learning, and I don't feel bad about it. Some comments were positive, and some were negative. Because I was helpfully told that I did not make eye contact with students in the centre of the classroom, I always bear that in mind now. This feedback system is outstanding (student 10).

Thirdly, teacher self-efficacy was enhanced when the pre-service teachers conceptualized and reviewed overall music education to

prepare their class plans and teaching guides:

I was able to conceptualize and organize basic music theories and subjects by connecting the curriculums with the music subject, and the music subject to other subjects (student 3).

Thus, these pre-service teachers gained confidence and enhanced their teacher self-efficacy to be outstanding educators in the future:

I never thought I would be able to run an inclusive class. But I did. ...I had to do a lot of research, as inclusive classes are uncommon. By combining music with Physical Education (PE), I learnt a lot about creatively conceptualizing and demonstrating an inclusive class (student 7).

Mentors' self-reflection journal entries showed that they gained more confidence in teaching classes and preparing teaching guides when they helped their mentees demonstrate their classes. Mentor and mentee pre-service teachers were also determined to overcome their weaknesses as educators. They eagerly explored diverse teaching methods, and believed the Music Education Course would improve the ways in which they ran their lessons in the future:

After I successfully completed all tasks and watched my team members demonstrate their classes, I felt like I had learned a lot. This was a good opportunity for me to examine different ways of demonstrating music classes. When I do become a teacher, the knowledge I acquired from this course will greatly contribute to my own class planning, teaching guide preparation and class management. Prior to taking this course this semester, I was insecure about preparing teaching guides. But I feel very confident now, and I believe I would be able to plan and run more diverse classes (Mentor 1).

I thought a lot about planning my own class as I

conducted this task. Of course, I knew it wouldn't be easy. But I believe I can do so creatively without copying others if I continue to learn about the related theories and information. This process greatly enhanced my self-efficacy (mentee 5).

## V. Conclusions and Discussion

Qualified educators have teacher self-efficacy and PCK in specialized areas, which enable them to efficiently run classes. This research examined the enhancement of pre-service teachers' PCK and self-efficacy through mentoring in team activities. Unlike existing studies on mentoring, the mentors were pre-service teachers with practical teaching experience rather than in-service teachers. By assigning pre-service teachers with practical teaching experience to the same team as peers without it, the changes to both parties' PCK and teacher self-efficacy could be better analyzed. Through teaching guide preparations and class teaching demonstrations, mentors used their precedent knowledge to provide advice and feedback to mentees. In turn, mentees applied this advice and feedback to their class teaching demonstrations. Analyses of participants' interview responses and self-reflection journals showed that class teaching demonstrations boosted their confidence and inspired them to consider the features of their future classes.

Positive changes in PCK and teacher self-efficacy were observed in 7 different knowledge-based areas, as seen in the participants' interview responses and self-reflection journals. By developing teaching guides and reviewing their peers' demonstration classes, pre-service teachers acquired diverse teaching methods to analyze themselves as

instructors. In learning to hold balanced classes and prepare diverse teaching guides from mentors and their peers' class teaching demonstrations, pre-service teachers in the graduate school of education's Music Education Course cultivated their expertise as music teachers while enhancing their PCK and teacher self-efficacy.

As experts specializing in educational theories and practices, music teachers must be able to run balanced classes. In short, well-prepared music teachers are educators with musical knowledge, practical skills, abundant experiences, and educational thinking. When well-prepared music teachers run effective classes, they will enhance the learning abilities of their students. To continuously enhance their PCK and teaching self-efficacy, pre-service music teachers who had completed the pre-existing practice-based education must come up with diverse teaching methods for their classes. It is necessary to provide an environment where pre-service teachers can escape from traditional lecture-based learning. This research did so by having the participants acquire practical teaching experiences through the preparation of diverse teaching guides and demonstrating classes. Teachers are the main agents of classes. The quality of classes will vary, depending on how teachers run their classes. By assessing the classes demonstrated by other pre-service teachers, the participants in this research were able to cultivate and examine their own PCK, and therefore expand the knowledge base for their own teaching activities in the future. In order to examine and expand their knowledge base, the pre-service teachers had to view their own and their peers' PCK from comprehensive and diverse

perspectives through various subject-related activities. Thus, the diverse teaching methodologies presented in the class demonstrations aided the pre-service teachers' cultivation of their expertise as music teachers and enhanced their teacher self-efficacy. In light of the conclusions drawn in this study, it would behoove pre-service music teachers to conduct research on the teaching-learning method as they train to become professional music teachers. Likewise, professional music teachers and pre-service teachers should engage in discussions and exchanges so as to share practical experiences in music class management. In so doing, they would enhance their teaching quality and be better able to positively impact student learning.

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