**Journal of Modern Education Review, ISSN 2155-7993, USA**
**April 2024, Volume 14, No. 3–4, pp. 112–118**
**Doi: 10.15341/jmer(2155-7993)/3–4.14.2024/003**

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# Professional Music Teachers' Knowledge and Beliefs: Re-forming Pedagogical Content Knowledge

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**Abstract:** The concept of "pedagogical content knowledge" (PCK) was introduced by L. S. Shulman. He specified 7 categories of professional knowledge required for teaching, and defined PCK as the "special amalgam of content and pedagogy that is uniquely the province of teachers, their own special form of professional understanding" (1987, p. 8) among them. Though some researchers have argued the existence of PCK, others have supported the notion that PCK is too general of a term and each of the 7 types of knowledge are integral. Furthermore, these frameworks have been used, expanded and challenged by a number of authors in the fields of mathematics, science, social studies, music, among others. Within music education, several researchers have investigated how PCK affects the transfer of instruction and preparation for teaching in a classroom setting. Ogawa and Murakami also examined the professional knowledge and skills of talented teachers, and proposed a transformative model in which PCK, SCK (Specialized Content Knowledge) and SSP (Selecting Strategies in Practice) were shown. The purpose of this study is to verify our model of organized professional music teaching knowledge. In study 1, 13 experienced music teachers in elementary schools were asked about their music knowledge, understanding and skills. In order to collect the data, a 26 item, 5-point Likert-type questionnaire was conducted. As a result of factor analysis (principal axis factoring with varimax rotation), PCK, SCK and SSP emerged as 3 factors. The majority of the teachers reported SCK (Mean = 4.4) and SSP (Mean = 4.5) were related to the core of professional music teaching strategies. In study 2, the responses of 42 university students in a pre-service teacher training course were gathered and compared before and after their teaching practice using the same survey form as Study 1 (adding "Are you able to"). There were significant differences between the before and after teaching practice via the Wilcoxon signed rank test ($p < .05$). All the students recognized the effectiveness obtained by the opportunities of practice. Some evaluated themselves more highly (73.4%) compared to before their practice, while others revealed an unsatisfactory level of detecting their lack of musical knowledge and skills (13.7%). The results of this study support our theoretical transformative model in which the 3 domains combine, and music experience in teaching practice is extremely beneficial for the development of pre-service teachers' musical knowledge and skills. Music educators should help students organize their training period in order to guide the development of student competence.

**Key words:** pedagogical content knowledge, specialized content knowledge, selecting strategies in practice, music teacher education

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## 1. Introduction

In the 20th century, the term, Pedagogical Content Knowledge (PCK) was proposed by Shulman (1986). He pointed out what and how teachers teach in school, and also classified 7 types of knowledge: (1) content knowledge, (2) general pedagogical knowledge, (3) curriculum knowledge, (4) pedagogical content knowledge (PCK), (5) knowledge of learners and their characteristics, (6) knowledge of educational contexts, and (7) knowledge of educational ends, purposes and values. These 7 types of knowledge were defined by Shulman as:

> "Within the category of PCK I include, for the most regularly taught topics in one's subject area, the most useful forms of representation of those ideas, the most powerful analogies, illustrations, examples, explanations, and demonstrations ---in a word, the ways of representing and formulation the subject that make it comprehensible to others" (Shulman, 1986, p.8).

Namely, Shulman identified PCK as very important knowledge among a teacher's knowledge base. According to him, these are the bodies of knowledge that distinguish the teaching profession from other professions. Since then, the concept of PCK has been adopted in all fields including music education. A lot of music researchers have investigated how PCK affects the delivery of instruction (Millican, 2009, 2012; Raiber & Teachout, 2014), rehearsal preparation (Wacker, 2016), applied music teaching (Emerich, 2015; Villarreal, 2010) and in-service teachers' observations (Hurrel, 2013). Many of them have explored the topics related to PCK, in spite of the fact that PCK was very widely used by them.

Since 2015, we have begun to develop a tool in order to collect quantitative and qualitative data in terms of talented teacher knowledge. Many valuable music class videos of discussions around professional knowledge were analysed and pre-service teachers' written responses to the videos were collected. This was due to the fact that beginning teachers possess a limited PCK (Nason, Chalmers & Yeh, 2012; Nilsson, 2008), and teaching experience is significantly related to the development of PCK. Our study revealed that there are some differences between PCK and Specialized Content Knowledge (SCK), and that many talented teachers use a variety of SCK related children's musical abilities. In addition, we have examined the professional vision for instrumental teaching of talented teachers and analyzed them (Ogawa & Murakami, 2020). As a result of an exploratory factor analysis of their responses (using Promax rotation), 2 factors relating to SCK emerged. After that, we revised the tool, new questionnaire for music teachers in which the feature of teachers' PCK, SCK and SSP (Selecting Strategies in Practice) become appear.

In study 1, our revised tool was used to collect the opinions from experienced music teachers in order to prove the validity for PCK, SCK and SSP. In study 2, university students' responses for pre-and-post educational training were gathered. The following research questions guided this paper: (1) What do experienced music teachers think about the PCK, SCK and SSP? (2) How do university students respond to the PCK, SCK and SSP? (3) What do university students think when they were required to attend teacher training? (4) Are there any differences between the before and after teacher training periods?

## 2. Study 1

### 2.1 Method

2.1.1 Participants

Participants were 13 talented music teachers (10 female, 3 male) from elementary schools in Okayama,

Hiroshima, and Tokyo. Their ages ranged from 41 to 53 (Mean = 44.2). All of them have experienced special music class as a music teacher, and also a classroom teacher in elementary school over 20 years. They have been teaching music for an average of 22.3 years, and they played one or more instrument(s).

### 2.2 Materials

Participants were required to answer a questionnaire consisting of 26 items, applied in 5-point Likert-type form: 1 = definitely not, 5 = absolutely yes. The questionnaire used in this study was revised from that used in Ogawa and Murakami (2020), the basic structure was similar to that which was used in the previous study. Participants were informed that their information would be kept confidential, and their participation was voluntary.

Instructions given to participants were following: The questionnaire list 26 teacher skills and behaviors. All items were generated from several open-ended interviews and related research literatures. We would like to know how experienced teachers, like you feel about each item. Read and check all items integrity. If you have any questions, please let me know.

### 2.3 Results

The majority of the participants reported most items as being “absolutely important/effective” or “very important/effective”. Factor analysis (principal axis factoring with varimax rotation) confirmed that the 26 items could be reduced to 3 factors: PCK, SCK and SSP. As evident in Table 1, the pattern is clear and interpretable; the majority of loadings exceeded .50. and only 2 cross-loadings exceeded .30.

Experienced music teachers believed that they should listen and respect the students’ opinions. They agreed that class management and class discipline are important roles as a music teacher. Many of them also have confirmed the students’ active learning is based on group activities. For SCK, participants indicated that their most useful knowledge and skills were about professional performance, conducting an ensemble and a choir, analyzing musical pieces and giving music history. Although some participants reported the importance of musical creativity, responses to this item had a larger variance than the other items in the study (Mean = 3.11, SD = 1.24). Furthermore, regarding SSP, most of them responded that they should show and explain the well-chosen strategies in order to make practice for each student. They also thought appropriate evaluation and assessment gave students good motivation.

The Pearson correlation value indicates that SCK and SSP correlate closely (0.58, $p < .001$). No correlations between PCK and SCK (0.34, $p < .001$) or PCK and SSP (0.29, $p < .001$) were present.

Following are notable comments made by 3 female teachers to be considered:

> “I usually tell my students structured practice is the most important thing. To analyze, organize and concentrate is important, when you practice.”
>
> “How to organize yourself in a structured way? The professional music teachers should guide their students’ practice schedules and show some successful learning strategies.”
>
> “You have to take your time to think and plan in order to improve your performance. Doing practice without thinking is meaningless.”

These responses demonstrate that knowing efficient and effective learning strategies is being perceived as an indispensable component of an expert’s professional knowledge. In this sense, some categories of SSP such as showing and explaining practice have a close relation with SSP.

**Table 1 Means and Results of Factor Analysis for the 26 Items**

| Item descriptions | Mean | F1 | F2 | F3 |
|---|---|---|---|---|
| **PCK (Pedagogical Content Knowledge)** | | | | |
| It is important to listen to the opinions and thoughts of students. | 4.51 | **.87** | .09 | -.23 |
| It is important to give accurate advice when a student fails. | 4.55 | **.82** | .07 | -.08 |
| It is important to decide the discipline of the class. | 4.42 | **.81** | -.04 | .21 |
| It is important to organize the class well. | 4.44 | **.79** | .05 | .24 |
| It is effective to teach each other in a group. | 4.09 | **.75** | .21 | .06 |
| It is effective to discuss in a small group. | 4.12 | **.68** | .30 | .07 |
| It is important to motivate students. | 4.58 | **.64** | -.03 | -.13 |
| It is important to be happy with your students when they are successful. | 4.39 | **.63** | .06 | .04 |
| It is important to support what students want to express. | 4.16 | **.57** | .09 | -.17 |
| **SCK (Specialized Content Knowledge)** | | | | |
| It is important to have professional knowledge and skills regarding performance. | 4.67 | .03 | **.84** | .41 |
| It is important to have professional knowledge about music history. | 4.27 | .33 | **.82** | .26 |
| It is important to have professional knowledge about musical pieces. | 4.49 | -.04 | **.80** | .37 |
| It is important to analyze musical pieces. | 4.74 | .34 | **.79** | .24 |
| It is effective to conduct an ensemble, and/or a choir. | 4.72 | .17 | **.78** | .20 |
| It is important to perform as a role-model for students. | 4.55 | .25 | **.69** | .29 |
| It is important to detect students' errors and correct them. | 4.51 | .21 | **.66** | .28 |
| It is important to have special musical creativity. | 4.09 | .10 | **.57** | -.04 |
| **SSP (Selecting Strategies in Practice)** | | | | |
| It is important to show a practice plan for each student. | 4.47 | -.07 | .24 | **.82** |
| It is important to explain how to practice for each student. | 4.61 | .02 | .09 | **.81** |
| It is important to strengthen students' weaknesses. | 4.52 | -.05 | .39 | **.79** |
| It is important to explain what to practice for each student. | 4.43 | .02 | .09 | **.78** |
| It is important to assess students' progress accurately. | 4.62 | -.11 | .25 | **.77** |
| It is important to expand the world of music for students. | 4.34 | .10 | .11 | **.66** |
| It is important to make students' practice enjoyable. | 4.51 | -.16 | -.03 | **.65** |
| It is effective to listen to the performances of famous musicians with students. | 4.46 | -.21 | .23 | **.62** |
| It is important to perform together with students. | 4.23 | .34 | .28 | **.58** |

## 3. Study 2

### 3.1 Method

3.1.1 Participants

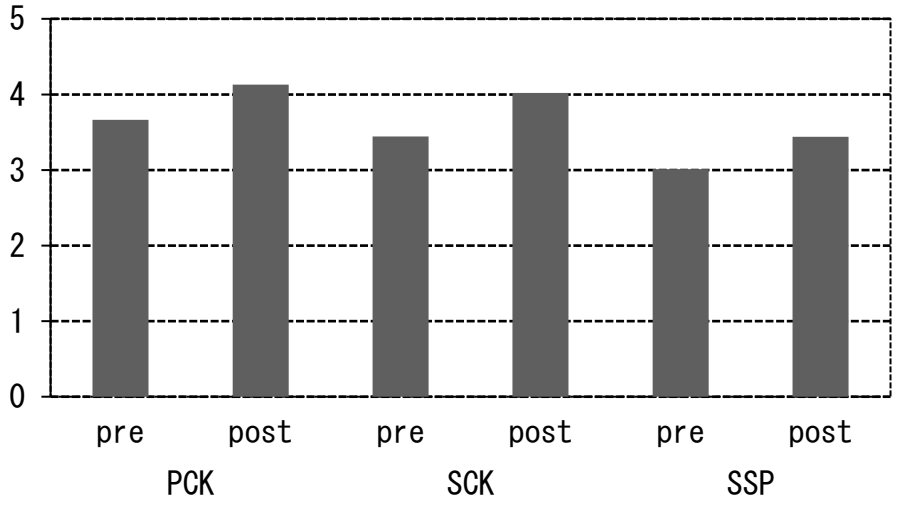
Ten male and 32 female students at Okayama University, aged 19 to 21 years old (Mean = 20.3) participated. Although all of them were in a pre-service teacher training course, their majors varied. Seven participants were music education majors, and others consisted of majors in: Japanese, science, mathematics, English, fine arts, early childhood, and so forth. Some of the female students have taken private music lessons in the past, and want to teach at elementary schools or junior high schools in the future.

### 3.2 Materials

All participants were asked to rate their feelings and thoughts about their educational teacher training on a questionnaire using the pre-and-post method. All of them have a month-long teacher training session in May or September at the attached elementary school to Okayama University. However, we had shortened the period in 2020 due to the COVID-19 pandemic. Before and after the training period, they were required to submit their questionnaires using a Google form. The questionnaire was similar to that utilized in Study 1. We replaced the beginning phrase of each item, "It is important/effective" to "Are you able to ….?". We also added one item for comments about their preparation in becoming teachers. The completed responses were returned by 40 students (response rate of 95%).

### 3.3 Results

There was a significant difference between the before and after training period via the Wilcoxon signed rank test ($p < .05$). Figure 1 shows the students' average score for the 3 factors compared in the 2 conditions: before and after.




(1 = definitely not, 5 = absolutely yes)

**Figure 1 University Students' Average Score Comparing Before and After Teacher Training**

In general, most students' scores regarding the considerable items of questionnaire had "slightly improved" after training. To all items of PCK, the majority of respondents reported improved scores, and 16% of them reported a score of 5 (on 5point scale) after training. On the other hand, some of them (38.2%) reported 4 and 5, while others (11.5%) detected poorly score for SCK. For some items in SSP, half of them evaluated themselves as having an "average level". Regarding 2 items of students' practice: what and how, small groups noted poor levels and debated whether it was necessary or not. On the free description, all students left interesting notes and comments. Following are some opinions from students which may be informative.

3.3.1 Music Major Students

A: Before our training period, I had so much confidence because I am able to sing and play some instruments better than average. But I panicked, when I stood on the platform and saw bunch of students' faces. My singing voice was harsh and couldn't conduct well. I realized my musical skill was below average. I should study more.

B: I couldn't commit to my students successfully, even though I have been a student conductor many times. I would like to learn many strategies to let students practice effectively.

C: Letting students practice with interest is the important thing, however, it was difficult to tell them.

3.3.2 Non-music Major Students

A: I had a good experience in which I supported my friend who was teaching music. Actually, I did well during the training period because my class was well organized and trained. I suppose that we need similar teaching strategies no matter what subject.

B: I have been studying how to analyze a musical piece during my training. I couldn't understand deeply the difference between reading pieces and analyzing them, though.

C: I understand well that the world of music is deep and wide. We should teach students about a lot of musical signs, such as *p, crescendo, ff, legato*.

D: It was not so hard to assess students' skill, so I believe my advice was appropriate. I didn't know exactly what practice students should do at home.

From these remarks, it should be noted that there is a big gap between music students and non-music major students with respect to their views on students' musical activity. Music major students tended to express their lack of specialized knowledge and skill, even though they were more talented than non-music majors. On the other hand, some non-music major students expressed optimistic opinions and behaviors. They seemed not to realize what specialized content knowledge and skill was.

To summarize the whole, we can say that some evaluated themselves higher (68.4%) compared to before their training, others revealed an unsatisfactory level detecting their lack of musical knowledge and skills (13.7%).

## 4. Discussion and Conclusions

The primary goal of this study was to verify our transformative model that organized professional music teaching knowledge. By gathering the responses of 2 studies, we may be able to measure the reliability of this re-framed model in which PCK, SCK and SSP existed.

The first and second research questions were what experienced music teachers and university students think about PCK, SCK and SSP. Through their responses, experienced music teachers have supported the multidimensional features of teachers' special knowledge and skill. As we have indicated already, their scores of SCK and SSP were very high. It is an important fact to stress that talented music teachers have a common view of what teachers should have, although their age, experience and careers are completely different.

Meanwhile, university students' responses had slightly different characteristics. Although there is considerable evidence to show that they felt the importance/effectiveness of all items for questionnaire, they tended to underestimate themselves regarding some items for SCK and SSP.

The third and final questions were about educational training. Most of us would expect that many students expressed a positive experience and higher scores after the training period. It is interesting to note that efficient interactions with other students or teachers were effective, regardless of the fact that they were not given the full period of time. For PCK, some evaluated themselves higher than before training. We also must draw attention to the difference between music-major students and non-music major students. Non-music major students had a more optimistic outlook than music major students.

The present study addressed using selected elements of Shulman's construct of pedagogical content knowledge, and reconstructed new model in the context of music education. Based on the results of these 2 studies, it can be hypothesized that both experienced teachers and students in pre-service teacher training course generally agree on which skills and knowledge are considered to be important. Namely, professional music teachers need to have 3 different types of knowledge: PCK, SCK and SSP.

However, it is debatable how SCK and SSP are related. Teacher's knowledge is actually not set, but a continuum and amalgamation of many thoughts or ideas (Ogawa, 2015). Therefore, it is important to determine the phase of integration of all components related teachers' special knowledge. There is more empirical research about novice music teachers and how to improve their special knowledge and skills. Within other disciplines, like mathematics and science, several research teams have been trying to construct a new model which shows special knowledge for teaching. Future studies of the reliability and validity of our model could increase the understanding about its generalizability.

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