

Full Length Research Paper

Evaluation of metacognitive competence of pre-service music teachers in terms of some variables

Okay Hakan

Balikesir University, Turkey.

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The purpose of the present research is to define pre-service music teachers' competence in using metacognitive activities in relation to academic achievement, gender, and class grade variables. The work-group consists of 131 pre-service music teachers, who study at Balikesir University Necatibey Faculty of Education, Programme of Music Teaching. "Motivational, Cognitive, and Metacognitive Competence Scale"(MCMCS) developed by Mok et al. and adapted to Turkish by Aktamiş and Uça was utilized as data collection tool with the permission of the researchers. For the analyses, t-test, One-way ANOVA and Spearman rank correlation coefficient tests were conducted. The effects of socio-cultural and demographic features on presenting metacognitive skills were discussed in accordance with the findings, and teachers were recommended to provide their students with opportunities to use metacognitive strategies within the scope of constructivist program perception. Additionally, many new research subjects were suggested for the literature in accordance with findings obtained.

Key words: Music education, metacognition, academic achievement, pre-service music teachers.

INTRODUCTION

What is primarily expected from a music teacher is to guide learners in making and listening to music. Presenting them with correct tools they would need to use while creating the musical product during musical performance is another important task. The act of making music is a multi-layer structure by nature, and all elements are of equal importance for a successful and holistic musical performance. Among these elements are time management such as tempo and rhythm; management of sound quality such as frequency, timbre and volume; and the awareness of cognitive elements, such as musical style, form and music theories. The combining these elements in a balanced and perfect

manner by the performer produces a successful musical performance. Music teachers should be able to combine these elements in the best possible way and in order to produce a high quality musical performance. Therefore, as both educators and performers (Pellegrino, 2009), music teachers are members of a unique discipline.

Multi-layer structure of musical performance requires some special skills, such as identifying one's strengths and weaknesses, evaluating oneself in terms of practicing process, evaluating the musical product, and developing learning strategies. These skills are defined academically with the concept of metacognition in educational sciences. Acquiring these metacognitive

E-mail: okay@balikesir.edu.tr.

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skills well is of utmost importance for a music educator, who is also a performer.

Even though there are some limitations in transferring findings obtained from researches in other disciplines on metacognition to the field of music making, some music educators have tried to contribute to this discipline with the researches they have conducted (Benton, 2014, p. 20). For instance, Akyüzlüer (2014) studied the metacognitive skills among pre-service music teachers, while Deniz (2015) examined their level of using metacognitive learning strategies.

In the field of educational sciences, in some disciplines metacognitive skills in teacher training are measured with some scales. Additionally, the related literature includes some studies on the interaction between metacognitive skills and some other variables. There are some researches conducted on metacognition in music education and music teacher training (Yokuş and Yürüdür, 2015); however the number of these is very limited.

With these previous studies, specifying the metacognitive skills of students- who get music education and are expected to become music teachers, and presenting the relations of such skills with various variables is still important and found required to raise new scientific questions. Academic achievement is one of such variable and is an important element in determining how equipped a student is. It is also an important evaluation criterion in educational sciences. Academic achievement represents the targeted task, and presents the situation of the student in attaining objectives in self-development.

Even though some researches have been conducted on the correlation between metacognitive skills and academic achievement in music education (Hollenbeck, 2008), the related literature does not include any studies on the prediction of metacognitive skills of pre-service music teachers with academic achievement variable. Such a study would be valuable in order to present important suggestions to the field. In addition to these, this present study tries to offer possible discussions in a broad framework by predicting metacognition by gender and grade variables as well as the academic achievement variable.

RELATED LITERATURE

Metacognition

Metacognition is referred to in many different terms in educational sciences literature (Van Zile-Tamsen, 1996). In the Turkish educational sciences literature however, the term "üstbiliş" appears to have been established (Özsoy, 2008). The use of different terminology for the concept may be due to different ways it is studied. "Metacognition" is often simply defined as "thinking about thinking" (Livinston, 2003). Many researchers believe that

metacognition is associated with intelligence (Kayashima et al., 2004). "Metacognition, a construct that is assuming an increasingly central place in cognitive development research, is defined in similar terms as awareness and management of one's own thought, or 'thinking about thinking'" (Kuhn, 2004).

Metacognition determines as simply made judgments about what a person knows or does not know about how to accomplish a task (Metcalfe and Shimamura, 1994: in Vos, 2001). Brown defines metacognition as it "refers to understanding of knowledge, an understanding that can be reflected in either effective use or overt description of the knowledge in question" (Gama, 2005). These efforts to define the concept indicate that metacognition is related to self-awareness and the effectiveness of this awareness on the time of accomplishing a task.

Flavell, having coined the term 'metacognition', suggested that metacognition is based on four basic phenomena as (a) metacognitive knowledge, (b) metacognitive experiences, (c) metacognitive goals (or tasks), (d) activities (strategies) (Flavell, 1979). Schraw and Moshman determined and discussed various metacognitive theories in their research (Schraw and Moshman, 1995). The concept continued to be discussed, and today it is considered as that it "consists of two components: knowledge and regulation. Metacognitive knowledge includes knowledge about oneself as a learner and the factors that might impact performance, knowledge about strategies, and knowledge about when and why to use strategies. Metacognitive regulation is the monitoring of one's cognition and includes planning activities, awareness of comprehension and task performance, and evaluation of the efficacy of monitoring processes and strategies" (Lai, 2011). The process in explaining the concept of metacognition and its theoretical structure has been taken by important suggestions about evaluating and guiding the self-learning experience in the life of educational sciences. Metacognition, which is also considered as the skill of evaluating one's own learning process and strategies, is considered to be effective on academic achievement, which is an assessment criterion of learning outputs. Accordingly, evaluating the relationship between metacognition and academic achievement is within the scope of the present research.

Relationship between metacognition academic achievement

Previous studies have revealed that metacognitive skills have an important effect on students' achievement (Zulkipli et al., 2008), and students with higher metacognition are more successful (Özsoy, 2008). Mahdavi (2014) evaluated many studies on the subject as "the good news is that metacognitive skills are teachable and learnable as well to build up support for

learners to better regulate their cognitive activities". Additionally, "metacognition is essential to successful learning because it enables individuals to better manage their cognitive skills and to determine weaknesses that can be corrected by constructing new cognitive skills" (Schraw, 1998). The positive effects of using metacognitive skills on academic achievement have been discussed in some previous studies. It is reasonable that this positive educational output is the subject matter of different disciplines in educational sciences.

The positive effects of metacognitive studies on learning processes of the learners have been the subject of many researches in different disciplines. Some examples are; computer education (Aktürk, 2011), history education (Candan, 2005), biology education (Pehlivanlar, 2005; Yangın, 2014), science education (Zohar, 2013), mathematics education (Memiş, 2013; Özsoy, 2009), economy education (Romainville, 1994), and nurse training (Nazik et al., 2014). The positive effects of using metacognitive skills on academic achievement in different disciplines show that academic achievement can be considered as an important variable of using metacognitive skills. Accordingly, within the scope of the present research, it is considered possible that metacognitive skills use among pre-service music teachers is predicted by academic achievement. In order to conduct studies on this subject matter, the literature on music education and metacognition should be reviewed.

Music education and metacognition

Some previous studies on the subject matter of the present research presented the importance of metacognitive strategies in music education (Leong, 2010). A music learner can have a more effective music experience no matter their level is during and after the process, if they can set their own strategies, are aware of their strengths and weaknesses. Hallam (2001), tried to define metacognitive and performance planning development among 22 profession and 55 volunteer musicians. The researcher found that professional musicians did indeed "learn to learn".

Making music generally refers to a musical performance. Developing music performance is about practice. In order to define the nature of music making, scientists studied the practice processes of musicians.

McPherson and Zimmerman (2002), who studied musicians' approaches to practice, describe the salient dimensions of self-regulated practicing as (a) motive (e.g., work through distractions, parental influence, self-motivation), (b) method (e.g., task-oriented strategies, mental strategies, self-instruction), (c) time management (e.g., planning, management, concentrate focus on tasks), (d) behaviour (e.g., metacognition, self-evaluation/monitoring), (e) environment (e.g., physical structure), and (f) social factors (e.g., parental

involvement, siblings, peers, help-seeking) (Cited in: Miksza, 2011). Torres and Montalvo (2004) provided a similar evaluation as: "Self-regulated learning is a fusion of *skill* and *will*. The strategic learner is one who has learned to plan, control and evaluate his or her cognitive, motivational/affective, behavioural and contextual processes. "Such a learner can conduct and develop their own musical practice application in their own learning process by taking initiative, as they are aware of their strengths and weaknesses. Metacognitive skills in music making of a pre-service music teacher are important in both creating their own musical products and guiding their learners in producing their own strategies.

Mok et al. (2007) referred to the studies conducted by Ames and Archer (1988) and Dweck and Leggett (1989)'s as "The traditional cognitive-metacognitive approach has been integrated with the motivational-metacognitive approach to explain the development and success of learning in school children". This approach includes the concept of self-motivated referred as "will" by Torres and Montalvo, as mentioned above. Accordingly, the concept of self-efficacy as one's belief in themselves to achieve something (Bandura, 1994), comes to the forefront as an important component of using metacognitive activities. Students, who believe that they have the necessary skills to be successful, try more and longer to attain their objective (Lewandowski, 2005; cited in: Özata, 2007). Clark (2008) found that students with high self-efficacy used cognitive practical strategies more than the students who had lower perceptions of self-efficacy and used less developed practical strategies. Therefore, self-efficacy perception and related motivation are important elements in the use of metacognitive activities.

Besides, "variation in teaching style to encourage students to research more, and the repertory of strategies" should be mentioned (Tait, 1992, cited in: Oo, 2008). This variation can also be about teaching students how to learn. McPherson (2005) stressed this finding of his research as "the importance of helping students to develop a repertoire of task-appropriate strategies that will enable them to think musically when performing challenging tasks on their instrument". Helping learners in developing their strategies required to make their own music is the responsibility of music teachers. Developing own strategies is an approach, directly related to metacognitive processes.

Yokuş (2010) found in her experimental study that metacognitive strategies had positive effects on the guitar education. Nielsen (2001), Topoğlu (2011) and Özmenteş (2013) reported in their research that students used a broad repertory of strategies consciously and could define those strategies. Bathgate et al. (2011) stated that new students of music who used metacognitive strategies had higher performance scores than others, even they had similar time periods to practice.

In the light of this information, we can claim that

Table 1. Descriptive frequency table.

Grade	f	%	Sex	f	%
1	36	27.5	Male	63	48.1
2	33	25.2			
3	34	26.0	Female	68	51.9
4	28	21.3			
Total	131	100.0	Total	131	100.0

metacognitive activities have positive effects on instrument performance and academic achievement. Using metacognitive activities skill is presented as a competence. Defining the using metacognitive activities skill and its relation to some variables, such as academic achievement and gender can provide new ideas about the instrument education. The purpose of the present research is defining pre-service music teachers' using metacognitive activities skills.

METHODS

Study group

Data obtained in the present research were collected from all grades. Data of the present research were obtained from 131 pre-service music teachers, who study at Balıkesir University, Necatibey Faculty of Education, Department of Fine Arts Teaching, Division of Music Education. As can be seen in Table 1, both gender and class grades of the sample present a close distribution.

Data collection instrument

"Motivational, Cognitive, and Metacognitive Competence Scale" (MCMCS) developed by Mok et al. (2007) and adapted to Turkish by Aktamış and Uça (2010) was utilized as data collection tool with the permission of the researchers.

The original scale consists of 35 items; and during its adaptation to Turkish 9 items were excluded due to cultural reasons and the Turkish version of the scale consists of 26 items. As the original form, in the Turkish adaptation of the scale, items are collected under six factors with and eigenvalue above 1, and these factors can explain 53.91% of the total variance. Cronbach's Alpha internal consistency of these six factors are; 0.701 for the first factor, 0.733 for the second factor, .707 for the third factor, 0.741 for the fourth factor, 0.722 for the fifth factor, and 0.773 for the sixth factor. These factors are called as; 1.self-efficacy, 2. true value of learning, 3. metacognitive strategies, 4. using learning strategies, 5. regulating learning process and 6. evaluating learning process. With these values, the scale took its place in the literature as a highly reliable measurement too.

In the present research, Cronbach's Alpha internal consistency coefficient of the scale was calculated as 0.92, which indicates perfect reliability.

Methods of data analysis

In order to define the correlation between achievement scores for

performance course and reading habit, Spearman Rho Correlation Coefficient test; and in order to define the relations with the gender and class grade variables independent samples t-test were conducted. Findings are tabulated and evaluated in findings and discussion part.

In order to define the tests to measure the relationships between MCMCS scores and academic achievement scores, first the distribution of the collected data should be determined. The results of One Sample Kolmogorov-Smirnov Test conducted to define the normality of data are presented in Table 2.

As presented in Table 2, MCMCS Score ($p=0.482$) does not distribute normally at $p>0.050$ level, but Academic Achievement Score ($p=0.037$) presents normal distribution. Accordingly, non-parametric Spearman Rho Correlation Coefficient test was conducted to define the correlations between these two variables, one of which does and one of which doesn't present normal distribution. With all aspect, the present study is a descriptive study.

FINDINGS

In this part, findings obtained from data analyses are presented.

As can be seen in Table 3, according to independent samples t-test results, there is no significant difference at $p < 0.05$ level across genders in terms of pre-service music teachers' MCMCS scores. Therefore, the use of metacognitive strategies among pre-service music teachers is at the same level for both genders.

As presented in Table 4, according to one-way ANOVA test results, there are no significant differences across different class grades at $p < 0.05$ level, in terms of MCMCS scores. Class grade doesn't have a significant effect on using metacognitive strategies among pre-service music teachers.

The correlation between MCMCS Score and Academic Achievement Score for pre-service music teachers was tested with Spearman Rho Correlation Coefficient test, and the findings are presented in Table 5. Accordingly, there is a weak and negative significant correlation between two variables at $p < 0.05$ level ($r = -0.244$, $n = 131$, $p = 0.005$). This is an interesting and unexpected finding.

RESULTS AND DISCUSSION

According to the findings, metacognitive skills of pre-service music teachers does not vary by gender and class grade variables at a significant level, and there is a weak and negative significant correlation between metacognitive skills and academic achievement.

As presented in Table 3, gender variable does not have a significant effect on using cognitive strategies among pre-service music teachers. On the other hand, Canca (2005) found that female participants used these strategies more than male participants in math lesson. In general terms, gender variable has a similar effect on academic achievement. However, considering the music education and art, it is reasonable that gender is not

Table 2. Kolmogorov-Smirnov tests for normality.

Normality	MCMCS score	Academic achievement score
n	131	131
Mean	2,5845	2.1800
sd	0.50001	0.62746
Absolute	0.073	0.124
Positive	0.046	0.124
Negative	-0.073	-0.051
Z	0.839	1.414
p	0.482	0.037

Table 3. Comparison of the MCMCS scores of the pre-service music teachers according to gender.

Gender	N	$\bar{\chi}$	ss	sd	t	P
Male	63	2.25	0.74196			
Female	68	2.11	0.49436	106.775	1.294	0.198

*p < 0.05.

Table 4. Comparison of the MCMCS scores of the pre-service music teachers according to class.

Class	N	$\bar{\chi}$	ss	Source of variation	Sum of squares	df	Mean square	F	p
1	36	2.21	0.70	Between groups	0.446	3	0.149	0.372	0.773
2	33	2.08	0.65						
3	34	2.20	0.42	Within groups	50.735	127	0.399		
4	28	2.23	0.73						
Total	131	2.18	0.63	Total	51.181	130			

Table 5. Evaluation of pre-service music teachers' MCMCS scores of according to their academic achievement scores.

Academic achievement	score
MCMCS Score	-0.244
p	0.005
N	131

*p > 0.05.

effective on using metacognitive strategies. As for the musical performance, it is known that many female performers have significant achievements for centuries. Especially in modern societies, women are also encouraged to make music, and they can have successful careers. Therefore, besides the known effect of metacognitive strategies on academic achievement, it is possible that gender is not an effective variable on

academic achievement, as it covers a dimension including musical performance.

As seen in Table 4 there are no significant differences between students at different grades in terms of their competencies in using metacognitive strategies. Pre-service music teachers, who have been getting education for a while, would normally be expected to be better at using metacognitive strategies, than the ones, who have just started their education, so this is a remarkable finding. Metacognitive strategies include a dimension that is related to awareness of oneself, but they can be developed with educational processes. The extent that educators of music guide their students in strategies is a debatable issue. On this issue, Karaman et al. (2014) suggested that: "Teachers, who have a central role in students' metacognitive development, should have sufficient knowledge on metacognition, so that they can apply teaching strategies accordingly. For this reason, it is of utmost importance that, teachers are educated on

metacognition.”

In the field of music education, especially the constructivist program provides music teachers with newer opportunities compared to the traditional education. Teachers, who gain the guiding role in constructivist program, are expected to help learners in discovering new ways of learning in all processes. Constructivist approach, applied in Turkish Educational System since 2006, gives teachers responsibilities, while providing them with opportunities, to guide students especially in the development of metacognitive strategies. For instance, in traditional education, source of knowledge is merely the teachers, and the assessment processes are conducted only by teachers, in constructivist education these responsibilities are mostly shared with the learners. We can claim that these skills can be activated directly by the use of metacognitive skills. The ideas that more qualified musical products can be created with the use of these skills in music education have been expressed before. In the path of musical discovery, constructivist program encourages students and teachers more than the traditional education. Accordingly, the finding that there are no significant differences between students at different grades can be interpreted as that the educators cannot fulfil their guiding roles. According to the experimental study conducted by Yokuş (2010), cognitive strategies have positive consequences, when they are taught students with correct methods.

Another reason for the finding about the grade can be the culture factor. The present research found that, the scale used in the research is perfectly reliable (Cronbach's Alpha= 0.92). However, 9 items were excluded from the scale during its adaptation to Turkish, and the researchers Aktamiş and Uça (2010) reported that this was due to cultural reasons:

“Some items were excluded because it was observed that these items lead students to make decisions and think on their own. For instance, the item “I prefer learning materials that are intended to make me think” was one of these. However, in Turkish educational system, new programs are aimed to make students think and research, but as the implementers of the program teachers cannot realize this completely, and the protective family structure in Turkey doesn't allow this. Therefore, those kind of items cannot work properly in Turkey” (Aktamiş and Uça, 2010).

Learners should experience the processes in regulation metacognitive activities on their own, and be aware of their self-efficacies. This is also related with that they are encouraged, guided, provided with opportunities in strategy development, and also they believe in success. Kuhn and Dean (2004) suggest that “It is only their own experiences that will lead them to the conviction that inquiry and reasoned argument offer the most promising

path to deciding between competing claims, resolving conflicts, solving problems, and achieving goals”. Therefore, besides the educators, families can have positive and negative effects on the issue. The finding related to the class grades indicates that students can use metacognitive activities to a certain point, but cannot go beyond. Further studies are needed on the subject matter.

Another important finding of the present research is about the correlation between academic achievement scores and metacognitive competence. There is a weak and negative correlation between these two variables. Even weak, this negative correlation indicates that students with lower academic achievement are better at using metacognitive strategies. This is an interesting finding, as the literature generally presents a positive correlation between these variables.

One reason for this finding may be that students with higher academic achievement know themselves better than the others who are less successful. In other words, they are aware of their strengths and weaknesses, and so develop a more conscious awareness on the issue. It should be kept in mind that, this interpretation is provided in accordance with the general findings in the literature.

With an opposite perspective, another reason may be that students, who are less successful academically, know themselves to an extent, but cannot reflect this on their academic achievement due to some reasons, such as wrong studying habits, lack of self-confidence, lack of motivation, and lack of opportunities for self-realization. In their researches Nielsen (2001), Topoğlu (2011) and Özmenteş (2013) reported in their researches that students used a broad repertory of strategies consciously and could define those strategies. Therefore, this finding on the academic achievement of music students suggests that some other psychological factors can also be effective.

Moreover, this finding can be interpreted in terms of the educational program as although constructivist approach has been implemented in education in Turkey since 2006, the effects of traditional educational approach are still felt. It is known that, traditional approach, which is teacher-centred, dictates students to reach an absolute fact, and is limited in terms of providing students with opportunities to discover themselves, cannot be effective in developing metacognitive strategies. Therefore, even students have comparatively stronger metacognitive skills; it is understandable that some students can have lower academic achievement, due to traditional approach followed in educational programs.

SUGGESTIONS

Following suggestions can be provided in accordance with the obtained findings;

1. Music teachers and academicians must have knowledge

of metacognitive skills, the nature of these skills and the methods for developing these skills, and raise awareness on the issue. This also requires knowing the nature of constructivist program. Different findings from further studies to be conducted in the following years that students at different grades have different levels of metacognitive skills will show that educators behave more consciously on the issue.

2. Academic achievement variable in the present research provides a general overview. Further studies should be conducted on the academic achievement in the courses that are directly related to cognitive domain, such as performance courses and formation courses. Correlation analyses to be conducted in these researches can provide more thorough information.

3. Similar studies should be conducted on music education programs in different cities with participants of different demographic and socio-cultural features. This way, it can be possible to define the effects of demographic and socio-cultural factors, such as city, living environment, and income on the use of metacognitive skills.

4. Students of music education programs should be observed in many practical areas, such as making music together, dictation, solfeggio, instrument performance, harmony practices, accompaniment, using musical technologies, and teaching; and their habits of developing and using metacognitive strategies, scrutinising their strengths and weaknesses should be reported scientifically in further researches.

5. It was observed that there are some students who have low academic achievement but are good at using metacognitive skills. Educational measures should be taken to use this situation in favour of students. Therefore, educators should be careful about the existence of such students. These students can be provided with opportunities to improve their self-confidence, such as vocalizing in a class concert, changing the way of communication, or behaving in accordance with their personality traits.

Conflict of Interests

The authors have not declared any conflict of interests.

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