A Relationship Between Creativity and Musical Achievement: A survey of music major trainee teachers in a teacher education institution

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Abstract

This study was carried out to determine the relationship between creativity and musical achievement among music major trainee teachers in a teacher education institution in Kuala Lumpur. Respondents for this survey study comprised 21 final year trainee teachers undergoing the four year Bachelor of Teaching Degree Programme majoring in Music Education. There were 7 males and 14 females. These respondents were the first intake of trainee teachers in this degree program. The mean age of these trainee teachers was 23.14 (SD=0.35). Creativity data was collected through Figural (Form A) of the Torrance Test of Creative Thinking (TTCT). Musical achievements of trainee teachers were measured using the Musical Achievement Test adapted from Colwell's Music Achievement Test (1968). The Music Achievement Test consisted of pitch discrimination, interval discrimination, meter discrimination, major-minor mode discrimination, auditory-visual discrimination, and cadence recognition. Results of the study showed that trainee teachers in teacher education institution were more creative in Figural Abstractness of Title followed by Figural Resistance to Premature Closure, Figural Originality, Figural Fluency, and Figural Elaboration. The overall Creativity Index was 114.1 (SD=13.29). The mean value of the Music Achievement Test (MAT) was M=69.4 (SD=11.13). The highest score was major-minor mode discrimination and the lowest score was degree of scale recognition. Figural fluency and figural originality were found to be significantly related to interval discrimination. This was also found to be significantly related to visual discrimination. Finally a statistically significant correlation was found between figural creativity and musical achievement. The findings indicate that music educators should encourage creative activities and exploit the development of original ideas in trainee music teachers.

Keywords *creativity, musical achievement, music education, trainee teachers*

Abstrak

Kursus ini dijalankan untuk melihat perhubungan antara kreativiti dengan pencapaian muzikal di kalangan guru pelatih di institut pendidikan guru di Kuala Lumpur. Reponden kajian tinjauan ini terdiri daripada 21 orang guru pelatih yang mengikuti program Ijazah Sarjana Muda Perguruan dalam Pendidikan Muzik. Guru pelatih terdiri daripada 7 orang lelaki dan 14 orang perempuan yang merupakan

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pelajar kohort pertama dalam program ini. Purata umur guru pelatih ialah 23.14 (SD=0.35). Data untuk kreativiti dikumpul dengan menggunakan Torrance Test of Creative Thinking (TTCT), Figural (Form A). Pencapaian muzikal guru pelatih pula diukur dengan menggunakan Ujian Pencapaian Muzikal yang diadaptasi daripada Ujian Pencapaian Muzikal oleh Colwell (1968). Kandungan Ujian Pencapaian Muzikal terdiri daripada diskriminasi pic, diskriminasi jeda, diskriminasi meter, diskriminasi mod, diskriminasi audio-visual, dan mengecam kaden. Keputusan kajian menunjukkan guru pelatih di institut pendidikan guru lebih kreativiti dalam komponen Figural Abstractness of Title diikuti dengan Figural Resistance to Premature Closure, Figural Originality, Figural Fluency and Figural Elaboration. Index kreativiti secara keseluruhan ialah 114.1 (SD=13.29). Nilai min untuk Ujian Pencapaian Muzikal (MAT) ialah M=69.4 (SD=11.13). Komponen yang mendapat pencapaian yang paling tinggi ialah diskriminasi mod major dan minor. Pencapaian yang paling rendah ialah mengecam pic yang terdapat di skel. Keputusan analisis menunjukkan bahawa terdapat korelasi antara Figural fluency dan Figural originality dengan diskriminasi jeda secara signifikan. Figural fluency juga mempunyai korelasi dengan diskriminasi visual. Akhirnya, didapati terdapat korelasi yang signifikan di antara figural creativity dan pencapaian muzikal. Dapatan ini menunjuk pendidik muzik perlu menggalakkan aktiviti kreatif dan berani memperkembangkan idea yang asal dalam diri guru pelatih di institut pendidikan guru.

Kata Kunci *guru pelatih, kreativiti, pencapaian muzikal, pendidikan muzik*

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Introduction

Many ideas, issues and studies concerning creativity have been discussed over time and there is an increased interest in this field because of its application to education, innovation, business, arts and science and society as a whole (Runco, 2007). The interest of researchers to find out more about creativity flourishes because creative thinking has been considered the highest of mental functions and as the peak of human endeavours (Palaniappan, 2005). According to Bloom (1956), creative thinking involves cognitive operation that is similar to the synthesis level in his taxonomy. However, there is still much more to be learned about creativity (Runco & Albert, 2010).

Many theories have been discussed to explain the meaning of creativity. The diversity of the theories postulated have left the subject fragmented (Palaniappan, 2005). However, these theories of creativity were classified into categories and will be discussed briefly here. Chua (2004) stated that there are three perspectives in the theories of creative thinking, namely the supernatural, rational and developmental. According to the supernatural perspective, creativity is inborn. This traditional view of creative thinking states that inspiration is the source of divine power that makes people creative. The second perspective, rationalism, claims that creative process is a natural consequence resulting from application of universal principles. Lastly, the developmental perspective states that man fundamentally prefers to learn in creative ways through creative and problem-solving activities. This perspective is supported by many researchers of creativity such as Torrance (1964) and Csikszentmihalyi (1996).

Most researchers agree that creativity refers to an individual's potential to create. Kratus (1989) in his study delineated three elements of creativity that are the person, process, and product. The person is the one who is directly involved in creating. This person comes to the creative task with varying degrees of experience and proficiency in the areas of originality, fluency, and flexibility. The creative process is where the creation takes place. It involves problem finding, idea generation, modification of ideas and evaluation of solutions. The outcome of the creative endeavour is the product.

According to Guildford (1968), stated in Palaniappan (2005), the four factors common to the creative individual are fluency, flexibility, originality, and elaboration. Fluency refers to the ability of the person to produce a number of appropriate responses during a limited time frame. Flexibility is the ability to produce different types of responses. Originality refers to the degree to which the responses produced are unusual or different. Elaboration is the ability to extend or enhance a simple idea. Torrance is also in agreement with these four factors that the process of developing creative thinking requires acknowledgement of divergent production abilities.

In Malaysia, academic achievement is the yard stick that is used to measure the intelligence of a student. This is the main focus and an important factor for many parents, students, teacher trainees, and educational administrators. Teachers, administrators and all those in the education system place special attention on academic achievement because it reflects the credibility of the school system and the achievement of the whole school. Musical achievement is also the yard stick that is used to measure the musicality of trainee teachers enrolled in a music major program. Music teachers need to have a high level of musicality in order to assist children under their care to enjoy

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and appreciate music. In order to develop the musicality of trainee teachers which is an essential requirement, the basis and appropriate educational experiences should be organized. Creative environments offered can affect the creativity and ability of those involved, states Csikszentmihalyi (1990). The culture in which the creative activity takes place and the social roles and norms that regulate the given creative activity influences how a creative person operates.

In 2007, a new program was offered in all teacher education institutions in Malaysia. This program, named Bachelor of Teaching with Honours, consists of three categories; the compulsory, core and elective components. The Music Education for Primary Education program covers 45 credits out of the total of 133 credits. All trainee teachers undergoing the Music Education program will need to complete all the courses offered. There are seven learning outcomes in this program and the one that approximates the creative aspect is the second learning outcome which states that music teachers who have completed this program should be able to use enquiry process and problem solving in learning through higher order thinking and critical thinking. Through document analysis, unfortunately, it was found that the creativity component was not given much importance in this Bachelor of Teaching Music Education program. However, there are a few courses such as Composition and Ensemble I and II offered in semester four and semester six which require trainee teachers to compose music.

Purpose

This study looked into the creativity aspects and musical achievement of the trainee teachers in Malaysia, and the relationship between these two variables because there is very little literature related to creativity development in general in Malaysia (Khien, 2003). This is supported by Yong (1994) who stated that in Malaysia, relatively little has been done to investigate the creative ability of the pupils and literature concerning musical creativity in the Malaysia context which is far behind in comparison to the West. Hence this study aims to provide a clearer picture about trainee teachers' creativity and the influence of each component of creativity towards musical achievement. The findings of this study may be able to assist lecturers to plan various creative teaching strategies in order to assist their students and consequently increase the trainee teachers' musical achievement and creative thinking.

Therefore the purpose of the present study was to examine the relationship between general creativity and the musical achievement of the final year trainee teachers in a teacher training institution.

Methodology

This study used a survey design to collect data. The Torrance Test of Creative Thinking (TTCT) Figural Form A and Music Achievement Test (MAT) were administered in semester eight during a trainee teacher sit-in session.

Participants

Twenty-one trainee teachers with an average age of 23.14 (SD=0.35) years participated in the study. They were 7 males and 14 females. These trainee teachers were enrolled in a teacher education institution in Kuala Lumpur, Malaysia. The respondents had undergone one-and-a-half years of preparatory music courses and another four years of Bachelor of Teaching in Music Education program. At the time of this study, the respondents were in semester eight which was their final semester of the program.

Instrumentation

Torrance Test of Creative Thinking (TTCT)

The Torrance Test of Creative Thinking Figural form A was administered to the respondents in a group setting. The TTCT is designed to measure creativity abilities and consists of three activities to assess the mental characteristics of fluency, elaboration, originality, resistance to premature closure and abstractness of titles (Torrance, 2008). The three activities are picture construction, picture completion, and repeated figures of lines or circles. This paper and pencil activity took 10 minutes per activity with a total of 30 minutes to complete the whole test.

The validity and reliability on the TTCT test has been studied extensively. It has not been found to be biased against any race or gender. The TTCT which was originally written in English was first translated into Bahasa Melayu by a teacher who was competent in both languages and used in a study by Yong (1986). Test-retest reliability for overall figural creativity was found to be 0.83. This result matched findings stated in the scoring guide where similar studies were carried out in the United States of America (Torrance & Ball, 2008).

Fluency, elaboration, originality, abstractness of title and premature closure are figural scoring. Raw scores of figural scoring were obtained by adding together the numbers scored in each activity. The raw scores were converted to a standard score, composite measure-average standard score, and creativity index using the 2007 Norms-Technical Manual for Figural (Streamlined) Form A and B manual. A lengthy and comprehensive guideline was used, alleviating the most common misinterpretations by assessors.

Music Achievement Test (MAT)

This is a self developed test based on the Colwell Music Achievement Test used by Webster (1979) and Auh (1995). This test consists of six sections, all of which assess aural and aural-visual skills that are related to the content in the course pro forma of the Music Education for Primary School Bachelor of Teaching program. The six sections comprised: pitch discrimination, interval discrimination, meter recognition, major-minor mode recognition, auditory-visual discrimination and cadence recognition. The MAT was administered as a group test and completed in 40 minutes.

A pilot test was carried out prior to the study on a similar group of a different semester. The reliability index of the MAT of the 22 samples in the pilot test was .81.

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Data collection

Both TTCT and MAT was administered as a group test. The TTCT which took 30 minutes was carried out before the MAT. During the TTCT, a short briefing was given to the respondents before each activity according to the Torrance Test of Creative Thinking Directions Manual Figural Forms A and B by Scholastic Testing Service (Torrance, 2006). In the briefing, respondents were encouraged to use their imagination to think of ideas and combine in various ways. Respondents were told to expand upon these ideas so that they would tell the most imaginative and exciting stories. A game-like atmosphere was created to avoid the threatening situation frequently associated with testing.

The MAT took 40 minutes to administer. Respondents were given an answer sheet which was set according to the flow of the test. With the help of a piano, the researcher played each item twice and a time of 10 seconds per item was given to the respondents to answer. At the end of the test, answer sheets were collected and analysed. The TTCT and MAT test were administered by the researcher. The Torrance Test of Creative Thinking used in this study measured the fluency, originality, elaboration, abstractness of title and premature of closure of the trainee teachers in a teacher training institution.

Data analysis

For reliability purposes, the TTCT was streamlined scored according to the Torrance Tests of Creative Thinking Streamlined Scoring Guide for Figural Forms A and B by Scholastic Testing Service (Torrance, 2008). Fluency, elaboration, originality, abstractness of title, premature closure raw score, figural creativity index and musical achievement were analyzed using the Statistical Package for the Social Sciences (SPSS Version 16) for quantitative analysis. The responses were analyzed through descriptive statistics such as frequency and percentages and the Pearson product moment correlations.

Results

Descriptive statistic of figural creativity index

The mean, standard deviations, medians, minimums and maximums for the figural creativity index of the 21 trainee teachers are shown in Table 1. The creativity index is the combination score of fluency, elaboration, originality, abstractness of title and premature closure with 13 special creative strengths. Torrance (1998) claimed that this index provided the most useful measure to reflect an individual's overall level of creativity.

Table 1 Means, standard deviations, medians, minimums and maximums of figural creativity index

Figural Creativity	Creativity Index
Mean	114.11
Standard Deviation	13.29
Median	115.80
Minimum	78.00
Maximum	135.60

Note: Torrance's Creativity Index, based on a 160 point scale, is the average of the age-based reactivity index plus the creative strength ratings which can total up to 26 additional points

The mean score for the creativity index is 114.11 and the standard deviation is 13.29. The median for figural creativity is 115.80 while the range is from a minimum of 78.00 to a maximum of 135.60. Since there is no national or international norm available at present, these values are compared with those carried out by Torrance. Torrance carried out a study on 70,093 students to develop the norms for Figural Forms A and B (Torrance, 2008). The mean value of the creativity index reported in the Norms-Technical Manual 2008 in Torrance's study is 108.8, and the standard deviation of 15.7 and a range of 73. Hence it was found that trainee teachers in this study have a higher creativity index mean score, wider standard deviation and a smaller range value.

The pattern of performance of creativity abilities of each component of TTCT can be seen by looking at the mean standard score presented in Table 2.

Table 2 Means and standard deviations of components in figural creativity standard score

	Components in Figural Creativity				
	Fluency	Elaboration	Originality	Resistance of premature closure	Abstractness of title
Mean	96.81	82.14	99.05	102.29	105.24
Standard Deviation	16.01	14.68	15.72	20.91	19.81

Based on the results presented in the above description, the pattern of performance for component abilities in figural creativity was found to be as follows:

Abstractness of title > Resistance of premature closure > Originality > Fluency > Elaboration

This pattern of performance indicates that in terms of standard score, abstractness of title has the highest score and elaboration has the lowest score. This shows that the trainee teachers have an organizing process of thinking and the ability to synthesize.

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They are able to capture the essence of the information and establish its importance to convey the picture with richness and depth. The results also show that trainee teachers have the ability to keep open and delay a closure long enough to make a mental leap that makes possible original ideas (Torrance, 1991). However, they are weak in imagination and exposition of detail where the mean of elaboration is the lowest.

Descriptive statistic of components of figural creativity

Table 3 Means, standard deviations, medians, minimums and maximums of components in figural creativity raw score

	COMPONENTS IN FIGURAL CREATIVITY				
	Fluency	***Elaboration***	***Originality***	***Resistance of premature closure***	***Abstractness of title***
Mean	21.19	4.52	16.71	14.14	11.91
Standard Deviation	7.42	1.37	5.15	4.50	5.24
Median	20.00	4.00	18.00	15.00	13.00
Minimum	8.00	3.00	8.00	5.00	2.00
Maximum	35.00	7.00	27.00	20.00	20.00

The mean, standard deviations, medians, minimums and maximums of components in figural creativity is shown in Table 3. The mean of the raw score for figural fluency is 21.19 and the standard deviation is 7.42. The median is 20.00 while the range is from 8.00 to 35.00. As for figural elaboration, the data shows that it has a mean of 4.52 and the standard deviation is 1.37. The median for figural elaboration is 4.00 and the range is from 3.00 to 7.00. For figural originality, the mean is 16.71 and the standard deviation is 5.15. Figural originality has a median of 18.00 and ranges from a minimum of 8.00 to a maximum of 27.00. As for resistance to premature closure, the mean is 14.14 and the standard deviation is 4.50. The median is 15.00 and ranges from 5.00 to 20.00. The results also show that the mean for abstractness of titles is 11.91 with the standard deviation of 5.24. Abstractness of titles has a median of 13.00 and ranges from 2.00 to 20.00.

Descriptive statistic of musical achievement

The mean, standard deviations, medians, minimums and maximums of musical achievement total score is shown in Table 4. The mean score for musical achievement is 69.41 and the standard deviation is 11.13. The median is 65.39 and ranges from minimum of 53.85 to maximum of 90.00. The results indicate that the performance of the trainee teachers in the musical achievement test is in the moderate range, with mean score 69.41 (SD=11.13).

Table 4 Means, standard deviations, medians, minimums and maximums of the Musical Achievement Test

Musical Achievement Score	Values
Mean	69.41
Standard Deviation	11.13
Median	65.39
Minimum	53.85
Maximum	90.00

***Note*:** The maximum of the musical achievement score is 130

Table 5 presents the score in percentage for all the components in the Musical Achievement Test. In the pitch discrimination of high and low pitches given, the trainee teachers scored better in the test of 3 pitches (84.52%) compared to 5 pitches (78.10%). They were able to identify the same pitch well (79.76%). As for discrimination of solfege and degree of scale (interval discrimination), the score for solfege was moderately low (58.10%) and trainee teachers failed to recognize most of the scale degrees (46.91%). Trainee teachers are able to identify meter of a short melody moderately well (68.57%) but they were very weak in identification of cadences (49.05%). Aural-visual discrimination score was moderately low (57.14%). Trainee teachers were able to identify well the tonality of a short melody (90.95%). Hence from the Musical Achievement Test, it was found that the highest aural ability of the trainee teachers is the ability to discriminate major and minor modes. The lowest aural ability was to recognize the scale degrees. They were also weak in the ability to recognize the cadences of a short piece played.

Table 5 Percentage of scores for each component in the Musical Achievement Test

Constructs	Percentage %
Pitch discrimination – 3 pitches	84.52
Pitch discrimination – 5 pitches	78.10
Recognition of same pitch	79.76
Interval discrimination – solfege	58.10
Interval discrimination – degree of scale	46.91
Meter recognition	68.57
Cadence recognition	49.05
Auditory-visual discrimination	57.14
Major-minor mode recognition	90.95

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The relationship between figural creativity and musical achievement

Pearson product moment correlation statistical analysis was carried out to ascertain the relationship between figural creativity and music achievement. The results are shown in Table 6.

The finding shows that fluency (r =.58, p < .01) and originality (r =.47, p < .05) were significantly related to musical achievement. As the music achievement measure increases, fluency and originality measures also increases. However, music achievement is not related to elaboration, abstractness of title and resistance of premature closure. In this study, the overall figural creativity score and overall musical achievement score are significantly related (r =.53, p < .05).

Correlation findings also identified significant relationship between solfege (r = .58, p < .01), degree of scale (r =.50, p < .05) and aural-visual discrimination (r = .49, p < .05) with the Figural Creativity. However, the other constructs such as pitch discrimination, meter and cadence recognition, aural-visual discrimination and tonality did not significantly correlate to all the five components in figural creativity.

Table 6 Product moment correlation coefficients between figural creativity and musical achievement

Constructs	Fluency	Elaboration	Originality	Abstractness of Title	Resistance of Premature Closure	Overall raw score of Figural Creativity
Pitch discrimination – 3 pitches	.42	.11	.28	.24	.09	.38
Pitch discrimination – 5 pitches	.32	.06	.31	.18	.00	.31
Recognition of same pitch	.13	-.18	-.02	.25	.07	.13
Interval discrimination – solfege	.70**	-.27	.64**	.08	.21	.58**
Interval discrimination – degree of scale	.63**	-.04	.59**	-.046	.19	.50*
Meter recognition	.16	.07	.20	.29	.40	.34
Cadence recognition	.16	.19	.09	.05	-.06	.12
Auditory-visual discrimination	.57**	.10	.30	.27	.15	.49*
Major-minor mode recognition	.09	-.20	.05	.10	-.07	.05
Total MAT score	.58**	-.04	.47*	.21	.18	.53*

** Correlation is significant at the 0.01 level (2-tailed)

* Correlation is significant at the 0.05 level (2-tailed)

Discussion

The data presented shows that trainee teachers in this study have a slightly higher creativity index mean score (114.11), wider standard deviation (13.29) and a smaller range value compared to the creativity index (108.80) and standard deviation (15.70) reported in the Norms-Technical Manual 2008 in Torrance's study. This finding shows similarities with the results of Yong's (1994) study where creative abilities of the pupils in the study were comparable to pupils of similar age and educational level in the United States of America.

Elaboration has the lowest score in the pattern of performance compared to the other components. This shows that trainee teachers were weak in imagination and exposition of details. This finding contradicts with the findings of Yong (1994). In Yong's study, elaboration component had the highest score. The ability of elaboration is highly desirable and should be cultivated in trainee teachers. The lack of this ability needs to be highlighted and taken seriously in the education practice in a teacher education institution.

As for the Music Achievement findings, the performance of the trainee teachers is in the moderate range with the mean score of 69.41 (*SD*=11.13). Trainee teachers were able to identify well the tonality of a short melody (90.95%) but they failed to recognize most of the scale degrees (46.91%). In Auh's (1995) study, pitch recognition also had the lowest score compared to interval and meter. Aural skills are only taught to trainee teachers in their first and second semesters. The findings show that the probable reason why aural skills have declined is because trainee teachers have not been exercising their aural skills. Hence, there is a need to have aural activities, especially pitch, taught directly or indirectly throughout the whole program.

There is a significant correlation between creativity and music achievement found in this study although the implication does not show a causal relationship. It is not known whether trainee teachers with high levels of creativity are good in music achievement or whether high achievers of music achievement test are more creative. What is known from the results, however, is that trainee teachers are more likely to have high music abilities when they are creative. Studies by Auh (1995), Baltzer (1989), and Webster (1979) found significant positive relationships between musical achievement and musical creativity.

As for the results of each component in the TTCT, the finding shows that fluency and originality were significantly related to musical achievement. As music achievement measure increases, fluency and originality measures also increases. However, music achievement is not related to elaboration, abstractness of title and resistance of premature closure.

Interestingly, this study also found the relationship between solfege and scale degrees with creativity. Solfege and the scale degrees are the interval recognition ability of trainee teachers. This ability is a required ability not only for the trainee teachers but it is an ability required to be taught in the primary school music education syllabus. It is hoped that students in the primary schools will achieve the ability to sing solfege well and have the ability to distinguish intervals.

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Conclusion

This study investigated creativity ability, musical ability and also the relationship between creativity and musical ability. The findings of the study stated that trainee teachers are capable of organizing process of thinking and have the abilities to synthesize. They are able to capture the essence of the information and establish its importance to convey the picture more deeply and richly. However in this setting, they are weak in imagination and the exposition of details. These findings suggest a need to increase the abilities of trainee teachers to combine ideas or objects, to add on to what already exists, and to create richness and greater clarity through detail. These are the weakest creative abilities found in the study. It is hoped that this study would provide some useful information to policy makers, curriculum planners and implementers to guide them in the formulation of programmes related to music education.

This study would like to encourage music teachers to incorporate activities that can enhance fluency and originality in their teaching in the classroom, as these may improve achievement in interval discrimination and aural-visual discrimination.

The creativity index found in this study probably shows that trainee teachers who had undergone the Bachelor of Teaching in Music Education program in a teacher education institution are creative. It is probable that music education is an environment through which students can learn creative thinking skills. This study has shown that there is indeed a statistically significant positive correlation between musical achievement and creativity.

Study Limitations and Future Research Directions

This study is limited in terms of the sample of subjects and the instruments used. The sample of the study comprised trainee teachers in only one teacher education institution. As such, the findings cannot be generalized to other groups. The Musical Achievement Test is a researcher designed test adapted from Cowell's Musical Achievement Test. This test is designed according to the content of the course pro forma for the Bachelor of Teaching Music Education program. Therefore, it may not be suitable for other music programs.

Further research is necessary to increase the literature of creativity and musical achievement in the Malaysian content. The evidence in this study suggests that trainee teachers are weak in figural elaboration. It is recommended that further research be carried out to ascertain whether this weakness is a general phenomenon among trainee teachers.

Replication of this study is highly recommended. Studies using a larger sample size, different age groups and different environments may help clarify the nature of these relationships and the findings of this study.

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Biography

Lim Zek Chew was awarded a Bachelor of Education degree from University of Otago, New Zealand in 1997. She then completed a Masters of Science in Music Education at Universiti Putra Malaysia. Currently, she is a part-time doctorate student at the University of Malaya. Lim Zek Chew has published articles in teacher education journals and bulletin of research. She has presented seminar papers at the second, third and fourth Music Educators' Conference, Malaysia and also at the International Society for Music Education Conference (ISME) in 2006. Her area of interest in research is music pedagogy, computer-assisted instruction in music education and exploring issues related to creativity. Lim Zek Chew has worked as a music educator in the primary school and she currently serves as a music education lecturer at Teacher Education Institution, Ilmu Khas Campus, Kuala Lumpur.