COMPUTER-AIDED MUSIC INSTRUCTION: AN IMPLEMENTATION OF THE USE OF NOTATION SOFTWARE IN A LOCAL TEACHERS TRAINING COLLEGE.

Mohd Hassan Abdullah
Teachers' Training Institute
Tanjong Malim, Perak

Minni Ang
Music Department
Universiti Putra Malaysia

ABSTRACT

In this research, 59 trainee teachers, from the fourth semester at the Sultan Idris Teachers Training Institute in Tanjung Malim, were selected as respondents. The pre-test involved the respondents answering a questionnaire designed to survey their attitudes and perceptions towards the use of the computer as a teaching aid for music. The pre-test also included a test on the respondent's ability to write music notation. The treatment or experiment conducted was in the form of a course on the use of the notation software "Coda Finale". Respondents were required to undergo a short training course, teaching them how to use this software. Upon completion of this course, respondents were re-tested on their ability to write music notation. Respondents were also required to answer the survey questionnaire on attitudes and perceptions towards the use of the computer as a teaching aid for music once more. Pre-test and post-test results were then analysed statistically. For the music notation test, it was found that the mean achievement on the pre-test was 60.85% whereas the post-test yielded a mean result of 80.12%. The increase in the mean value of the post-test as compared with the pre-test indicates that the respondent's skill at writing music notation increased after undergoing the treatment. The research hypothesis based upon the result of the paired t-test indicates that this increase is significant. Research findings indicate a significantly improved performance in music writing skills from candidates who gained experience with notation software. A significant improvement (23 points on the computer literacy test) in computer literacy as well as attitudes and perceptions towards computers (2.39 point increase) was also shown. However, no significant correlation was found between computer literacy levels and music writing skills or attitudes and perceptions towards computers and music writing skills. A significant correlation was found however between students' attitudes and perceptions towards computers and computer literacy levels. All these findings indicate that a higher level of music writing skills may be attained with the aid of music notation software and computer based training, and that a side effect of increasing computer literacy and improving attitudes and perceptions towards computers results from such use. The other important finding is that prior experience with computers and good attitudes and perceptions towards computer-based training has no effect on a candidate's ability to learn music writing skills.

1.0 Introduction

Bresler [1] found that the computer is an effective learning tool that enables students to self evaluate learning difficulties, to think analytically, to develop systematic work habits and to concentrate fully on tasks at hand. The computer has been widely used as a tool for learning music [2, 3, 4, 5, 6, 7, 8], though its effectiveness in this capacity has been debated [9, 10, 11]. In recent years, hundreds of new software packages for music and music education have been released, including many specifically for the purpose of producing printed music notation. These software packages have automated various music writing processes, such as transpositions into various different keys and clefs. Functioning in much the same way as other desktop publishing software packages, user familiarity with common functions such as copy and paste means that the student is able to focus fully on the content to be learned and not the procedure used in learning. The student of music notation is thus free to experiment with musical elements such as melody, rhythm, harmony, tone colours and dynamic range, which can be easily played back for audible results facilitating further modifications. Studies have shown that the use of the computer in this way may enhance musical creativity, thus enhancing students' music learning potential [12, 13, 14]. Music education in Malaysian schools is relatively new, being introduced only in the past five years. Music teachers' training colleges have focused mainly on traditional teaching methods, with little emphasis on using computers for this purpose, with the exception of the Universiti Putra Malaysia Bachelor of Music degree program [15]. However, an awareness of the potential of using computers in music education is fast arising, in line with the government emphasis on information technology in general. The present study has arisen out of the need for recommendations with respect to the use of computers in music education in the local Malaysian context.

2.0 Design of Study

59 trainee music teachers, from the fourth semester of the Malaysian Teacher's Diploma program at the Sultan Idris Teachers Training Institute in Tanjung Malim, were selected as respondents. Candidates all possessed music theory competency rated as equivalent to Grade Five of the Associated Board of the Royal Schools of Music (ABRSM) external examinations. The pre-test involved the respondents answering a questionnaire designed to survey their attitudes and perceptions towards the use of the computer as a teaching aid for music. The pre-test also included a test on the respondents ability to write music notation.

The treatment or experiment conducted was in the form of a course on the use of the notation software Coda Finale. Respondents, each provided with their own personal computers loaded with this software, were required to undergo a short training course teaching them how to use the software, lasting a total of nine hours. Details of the course are provided in Table 1.

Table 1. Outline of Notation Course Curriculum.

Session	*Content*
1	Introduction to Finale97 software package Hardware setup and soundcard configuration
2	Pull-down menu item functions Staff preparation
3	Key and time signatures Simple entry tool
4	Speedy entry tool
5	Braces, slurs, dotted notes, triplets, accidentals Score expression tool and tempo tool
6	Playback control and patch settings
7	Staff expression tool, score expression tool and smart shape tool
8	Lyric tool and page layout tool
9	Special notes, transposition, printing

Upon completion of this course, respondents were re-tested on their ability to write music notation. This test required students to produce a complete score, between 16 to 32 bars in length. Student music writing ability was assessed based on the factors in Table 2 below. This assessment scheme was adopted from Jacobsen [9] and Boyle and Radocy [16].

Table 2. Marking Scheme for Music Writing Test.

Item evaluated	*Maximum marks*
Clef, key signature and accidentals	10
Correct use of meter	10
Note values and groupings	10
Appropriateness of rhythm	10
Appropriateness of tempo	10
Musical form	10
Syllabic or melismatic lyric writing	10
Standard format for score	10
Neatness of score	10
Total	*100*

Respondents were also required to answer the survey questionnaire on attitudes and perceptions towards the use of the computer as a teaching aid for music once more. This questionnaire contained four categories of questions with regards to the use of computers: enjoyment, fears, confidence with respect to ability to use computers, and the integration of computers in the classroom, as well as a section pertaining to computer literacy.

3.0 Results

Pre-test and post-test results were analysed statistically.A summary of the results is shown in Table 3 and Figure 1.

Table 3. Summary of Pre-Test and Post-Test Result Averages.

Test type	*Pre-test result*	*Post-test result*
Music writing test	60.85	80.12
Attitudes and perceptions towards computers	66.95	69.34
Computer literacy test	44.53	67.53

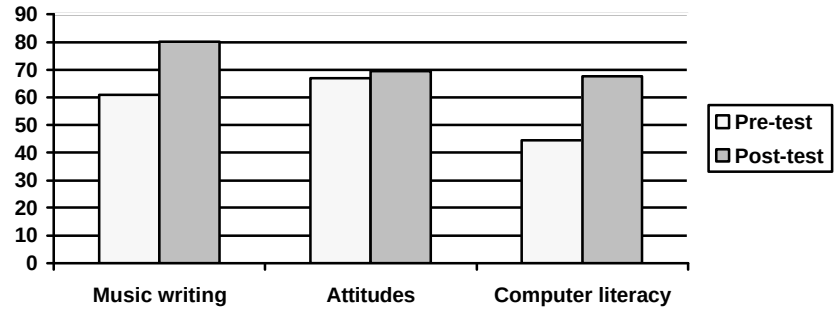

Figure 1. Graph Representation of Pre- and Post-Test Results.

For the music notation test, it was found that the mean achievement on the pre-test was 60.85% whereas the post-test yielded a mean result of 80.12%. The increase indicates that the respondents' skill at writing music notation increased

after undergoing the treatment. A significant improvement (23 points on the computer literacy test) in computer literacy was also observed. An improvement in attitudes and perceptions towards computers (2.39 point increase) was also shown. No significant correlation was found between computer literacy levels and music writing skills or attitudes and perceptions towards computers and music writing skills. A significant correlation was found however between student attitudes and perceptions towards computers and computer literacy levels.

4.0 Discussion

Several factors may contribute towards the results observed. The use of the computer in music learning may be perceived as more interesting than the traditional paper and pencil approach. The present trend towards computerisation in general may also contribute towards the positive response to using this approach in music learning. It is noted here that while the use of computers improves music writing skills in general, an aptitude for computers does not imply an aptitude for writing music, and neither does a lack of computer skills mean that a student can not be skilled at writing music.

5.0 General Conclusions and Suggestions

A higher level of music writing skills may be attained with the aid of music notation software and computer based training. A side effect of increasing computer literacy and improving attitudes and perceptions towards computers results from such use. Prior experience with computers and good attitudes and perceptions towards computer based training has no effect on a candidate's ability to learn music writing skills. The results of this study indicate that to introduce a wider usage of computer assisted music education in the Malaysian context would bring positive results with respect to student interest and achievement levels. Schools already equipped with multimedia computers in the recent government drive to promote the use of information technology in education need only to add the appropriate music software to their present setup. Teacher training should be upgraded to include training in the new media. At the same time, music software targetted especially at the needs of the Malaysian music education system may be developed.

Bibliography

1. Bresler, L. (1987). *The Role of Computers in Music Theory Classroom: Integration, Barriers and Learning.* Unpublished Doctoral Dissertation, Stanford University.
2. Thostenson, M.S. (1988). "Project in Aural Interval Identification, Phase One." *Proceedings of the Annual Meeting of the Association for the development of Computer-Based Instructional Systems.* Dallas: ERIC Document Reproduction Services No. ED 160087.
3. Higgins, W. (1992). "Technology." *Handbook of Research on Music Teaching and Learning.* Pp. 470-479. New York: Schirmer Books.
4. Dean, J. and Taylor, J. (1997). "Technology Standard for College Music Degrees." *Music Educators Journal.* 84(1): 17.
5. Waters, B. (1990). "Technology for Teaching." *Music Educators Journal.* 77(3): 66.
6. Reese, S. (1998). "Music Learning in your School Computer Lab." *Music Educators Journal.* 85(3): 31.
7. Bissell, P. (1998). "Tune in to Technology." *Music Educators Journal.* 85(2): 36.
8. Krogh, J. (1998). "Getting Started with Notation Software." *Music & Computers.* July/August 98.
9. Jacobson, J.R. (1996). *Effectiveness of a Computer-Assisted Instruction Program in Music Fundamentals applied to instrument for Elementary Education Majors.* Unpublished Doctoral Dissertation. Greeley: University of Northern Colorado.
10. Shannon, D.W. (1992). *Aural visual Interval Recognition in Music Instruction: a comparison of a Computer-Assisted Approach and Traditional In-Class Approach.* Unpublished Doctoral Dissertation.Los Angeles: University of Southern California.
11. Glass, J.S. (1986). *The Effects of a Microcomputer-Assisted Tuning Program on Junior High School Students' Pitch Discrimination and Pitch Matching Abilities.* Unpublished Doctoral Dissertation. San Francisco: University of San Francisco.
13. Conant, B.H. (1988). *A Study of Cognitive Processes of Children Creating Music in a Computer Learning Environment.* Unpublished Doctoral Dissertation. Amherst: University of Massachussets.
14. Upitis, R. (1989). "The Craft of Composition: Helping children create Music with Computer Tools." *Psychomusicology.* 8(2): 151.
15. Webster, P. (1989). "Composition Software and Issues Surrounding its Use in Research Settings with Children." *Psychomusicology.*8(2): 163.
16. Ang, M. and Gan, D. (1999). *UPM Music Department Home Page.* (Online). Available: http://www.music.upm.edu.my/ [25 April 2000].
17. Boyle, J.D. and Radocy, E.R. (1987). *Measurement and Evaluation of Musical Experiences.* New York: Macmillan Incorporated.

ABOUT THE AUTHORS

Mohd. Hassan bin Abdullah graduated with a Bachelor of Arts in Music (*Cum laude)* from the University of Carbondale, USA. In 1999 he obtained his M.Sc. in the field of Music Education at Universiti Putra Malaysia.

Minni Ang received her B.Sc.Hons. in Physics from Universiti Malaya, her GBSM in Percussion Performance from Birmingham Conservatoire, and her Ph.D. in Computer Applications in Music from Universiti Putra Malaysia. She is currently the Head of the Music Department at UPM. Her current research interests include music synthesis technology and musical instrument acoustics. She is a member of the Audio Engineering Society, the Acoustical Society of America, the American Institute of Physics, and the International Computer Music Association.