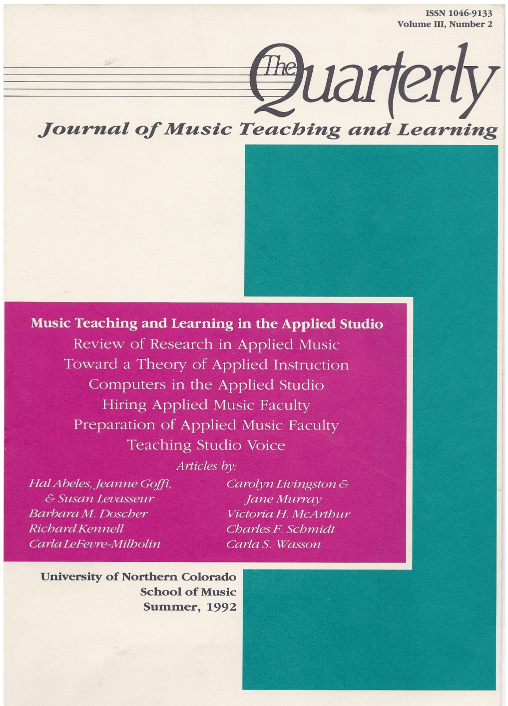

Title: Are Computers Doing the Job? The Effectiveness and Attitudes Surrounding Micro-computer Instructional Use in the Private Music Studio

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It is with pleasure that we inaugurate the reprint of the entire seven volumes of The Quarterly Journal of Music Teaching and Learning. *The journal began in 1990 as* The Quarterly. *In 1992, with volume 3, the name changed to* The Quarterly Journal of Music Teaching and Learning *and continued until 1997. The journal contained articles on issues that were timely when they appeared and are now important for their historical relevance. For many authors, it was their first major publication.* Visions of Research in Music Education *will publish facsimiles of each issue as it originally appeared. Each article will be a separate pdf file. Jason D. Vodicka has accepted my invitation to serve as guest editor for the reprint project and will compose a new editorial to introduce each volume. Chad Keilman is the production manager. I express deepest thanks to Richard Colwell for granting VRME permission to re-publish* The Quarterly *in online format. He has graciously prepared an introduction to the reprint series.*

Are Computers Doing The Job? The Effectiveness And Attitudes Surrounding Micro-computer Instructional Use In The Private Music Studio

By Victoria H. McArthur
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Over the past decade, computer-based instruction (CBI) has steadily gained acceptance among increasing numbers of private music teachers. The energetic pioneering efforts of such companies as Apple Computers and Temporal Acuity Products has brought a diverse range of both hardware and software products to the music education marketplace. Many of these products were intended to assist in educating young music students. Today, many of these early products appear to be rather primitive attempts to harness the limited capacity of early microcomputers and music software in presenting music students with intellectually and musically challenging and artistic instructional courseware.

Since the early 1970s, when computers first began to be used for music training, a generation of young students has passed through music studios. Some of these students were involved in early efforts to instruct and provide practice opportunities via computer-based instruction. It now seems appropriate to evaluate the effectiveness of this instructional format and the attitudes inculcated among teachers and students through its use.

Background

Several studies have investigated the effectiveness of computer-based instruction in the context of both conceptual and aural skill development among college students. In a 1974 study, Placek evaluated the effectiveness of the Plato system in improving college-aged music education majors' understanding of rhythmic notation and ability to relate aural stimuli to the notation. In addition to achieving learning gains, the subjects also expressed overall positive attitudes toward working with the computer. Deal (1985) found there to be no significant difference between two groups of college-aged students working on rhythm and pitch-error detection tasks presented either in a traditional programmed text format or in a computerized version of the same programmed text. Three types of instructional approaches (programmed text, computer-assisted instruction, and traditional textbook) applied to teaching the concept of music intervals were compared by Canelos, Murphy, Blombach, and Heck (1980). The computer instruction proved superior to both other techniques and the programmed instruction demonstrated superiority over the textbook approach. In a comparison of the effectiveness of computer-presented instruction in melodic dictation versus traditional group instruction of the same skill, Taylor (1982) observed that the performance of both groups was approximately equal.

The testing of the effectiveness of computer music instruction for students younger than college age has not been widespread. Willett and Netusil (1989) stated that there is

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a need for evaluation of music software in pre-college school settings. In this same report, the authors contrasted computer drill and classroom drill measured within the instructional context of bass clef notation reading gains by fourth grade students who were classified as being either field dependent, field independent, or neither. The computer group achieved superior gains over the traditionally instructed group.

A series of studies conducted by Kulik and others (Kulik, Bangert, & Williams, 1983; Kulik, Kulik, & Bangert-Drowns, 1985) investigated nonmusical subject areas using various aged students. Overall trends indicated the effectiveness of computers as instructional tools across a broad range of student subjects. Some authors (e.g., Barnett & Vogel, 1988) stress that "...the best software is interactive. It requires children to respond to challenges, thereby creating active rather than passive learning" (p. 1F).

Not everyone has been enamored with computers in instructional settings. It has been said that "much of today's music software is boring enough to have earned the name 'drill and kill'" ("Piano Teachers," 1985). In the same article, the criticism was advanced that computers often produce dull and unmusical sounds which lack richness of tone color. Lehmann (1986) stated that "Any teacher who can be replaced by a computer should be" (p. 73). Fisher (1982) echoed almost the same sentiment: "Interaction with a computer, of course, will not educate as effectively as interaction with a good teacher" (p. 20). He continued by blaming the sad state of affairs on the poor pedagogy reflected in most commercial courseware which commonly demonstrate no more than "electronic page turning" (p. 22).

Hodges (1982) proposed several plausible causes for negative sentiment among some music administrators and teachers toward computers. First, due to the similarities of some computer graphic displays to video games, some educators view computers as sophisticated but unmusical toys. Second, computers, like metronomes, tape recorders, and other supplementary music training devices, may be abused if overused or applied inappropriately. Third, hardware sophistication has surpassed the overall quality of available music software.

Among students, computer-based instruction has received mixed reviews. Willett and Netusil (1989) found that 75 fourth graders demonstrated overall positive responses to a short-term project using computers in music. College-aged students (Placek, 1974) stated that they enjoyed practicing ear training on the Plato computer due to the factors of grading confidentiality, immediate instructional feedback, graphics, variation of examples, and attempts to humanize or inject humor into the instructional process (for example, upon a correct response to a question, the computer might display ("Way to go, John!"). In contrast, Pembrook (1986) found that college students utilizing the MEDICI melodic dictation program written for the Plato system felt that the instruction took too much time, was not enjoyable, and did not provide adequate feedback. In this study, most students believed that ear-training in the traditional classroom provided more prompt feedback regarding their performance than did the computer practice situation. This study also proposed the somewhat surprising and whimsical notion that college students like graphic positive reinforcement from the computer in such forms as happy faces.

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With such a morass of confounding evidence surrounding computer instruction, the

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author set out to investigate certain marketing claims made by some companies seeking to sell hardware and software to private music teachers. Specifically, the marketing strategies aimed at the private music teacher have often stressed the following:

(a) the computer's effectiveness as both a teaching (tutorial) and practice (drill) tool;
(b) the computer's inherent motivating qualities which spur young students to "have fun while learning music;" and
(c) the use of the computer to increase private teachers' income without increasing their workload.

The specific aim of this study was to examine the veracity of these three issues both from the viewpoint of the private music teacher and from that of the music student.

Method

For this study, two approximately parallel questionnaires were designed. The first evaluated the responses of 24 private studio teachers. The second evaluated the responses of their students (N = 106). The teachers were volunteers in attendance at a Music Teachers' National Association conference; they represented the subset of those who used computer courseware in the music instruction of young students. This sample was judged as representative of the population of music teachers who attend national music conferences, teach students aged 10 and above, and who employ computer-based instruction in their private studios. The actual respondents represented 38 percent of those who initially volunteered to administer the survey.

While attending a presentation dealing with computers in the music studio, teachers were asked to volunteer for the survey by raising their hands if they used computers for instructing young students, and if they were interested in participating in a study investigating the uses and attitudes regarding computer instruction in the music studio. Each volunteer teacher received a packet containing a cover letter describing the purpose of the study, the recommended procedures for administering the survey, one teacher questionnaire, five student questionnaires, one envelope for each of the five student questionnaires, and one large stamped self-addressed envelope for all six of the completed questionnaires.

Teachers took the materials back to their hometowns following the one-week conference. They were asked to administer the survey as soon as possible by doing the following:

- distribute a student survey packet to the first five students aged 10 and above who came for music lessons during the week following the conference;
- ask the students to complete the questionnaire either at home or in the studio following their lesson;
- refrain from consulting with students (except to supply computer hardware names if asked); and
- avoid looking at student answers..

Each student packet also contained a cover letter written in language appropriate for an average 10-year-old emphasizing that the questionnaire was to be completed without help from their teacher (with the exception of the hardware names), and that their teacher would not know any of their answers unless they themselves told them. The students sealed the completed questionnaires in the envelopes provided.

After all the questionnaires were completed, teachers were requested to place all of the sealed individual questionnaires inside the large envelope, along with the teacher's questionnaire. Then the complete packet was mailed back to the author by a specified date.

The design and content of the two questionnaires were based in part on a model used by Pembrook (1986), who investigated attitudes of college-aged music students toward ear training instruction with computers. In this present study, both teachers' and students' questionnaires contained 28 questions requiring a variety of response modes such as dichotomous or yes/no, a Likert-type (five-degree) scale, and constructed free response.

The questions were grouped under the following five broad categories. First, basic background information was sought relating to each teacher's student load and the types (names of instruments and lesson configuration) of instruction offered; the hardware, software, and peripheral equipment used in instruction; the physical environment of the computer lab and the availability of a human monitor or helper; the amount and regularity of usage required of students; and fees charged for computer use. Second, teachers' opinions were polled concerning their perceptions of the quality of the hardware and software; their students' likes and dislikes of software features (e.g., scoring or happy faces); additional software needs not yet met; problems encountered in administering their labs; and their overall rating of computer-based musical instruction for children.

The student survey requested background information from each student about basic issues such as age and length of music study, the amount of time spent using computers with music each week, and if a human monitor was available during that time, whether they have a computer at home, and if so, what brand. Students also were asked about the visual and sound production quality of the hardware, liked or disliked features in the software, specific favorite and least favorite programs, and whether adequate encouragement was provided in the software. The last set of questions dealt with such issues as "Is a human teacher more fun or helpful?," "Are you a better musician because of the computer?," and "Do you like computers?," and "Do you like music lessons?"

Raw data were transcribed by hand (scan sheets were not employed) and subsequently analyzed for frequency counts, percentages, and Chi-square (when appropriate) using the Statistical Package for the Social Sciences (Nie, Hull, Jenkins, Steinbrenner, & Bent, 1975). Alpha was set at .05 level for all statistical tests (Siegel & Castellan, 1988).

Results

Since the teachers who volunteered to participate in this study were attending a national convention located in the far western area of the United States, it was not surprising to find that the respondents from that region represented over 50 percent of the totals. The other 50 percent of teacher and student respondents were distributed throughout the other regions of the country almost equally.

Teachers' Responses

The following summary statistics represent teacher responses to the group of questions classified as basic background: 79 percent teach piano and/or organ, 75 percent use some form and extent of group instruction, and 29 percent combine private and group lesson formats. Sixty-three percent of the respondents charge an additional computer fee; of this group, 54 percent responded that the fee ranges between $4.00 and $13.00 per month, and 29 percent charge between $4.00 and $6.99 per month). Seventy-one percent use some model of Apple computer, 70 percent generate the music sounds from a built-in device, 79 percent require or recommend that their students use the computer weekly, and 29 percent give some type of tangible award for computer use and/or achievement.

Teachers' attitudes were: 96 percent judged the visual (screen) displays to be good; 63 percent stated that the sound quality was good; and 71 percent found their equipment to be reliable almost all the time. Teachers stated that there was a need for more software for the young beginner (25 percent) and for composition (13 percent). The most frequent free responses to the question regarding problems in the set-up and administration of a lab were:

(a) lack of adequate space;

(b) high noise level (if the equipment was located in the teaching studio and the students did not use headphones);

(c) inadequate time for administrative tasks such as selecting hardware and software, organizing the computer curricula, attending to students' questions and problems while also teaching a lesson to another student.

Teachers' favorite programs were *Alfred Basic Piano Theory* (Alfred Publishing Co.), *Maestro Music* (Maestro Music, Inc.), and

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Rhythm Machine (Temporal Acuity Products/MicroMusic). Characteristics that teachers prefer in programs include variety of activities, "fun" format, attractive screen format, quality sound, and tutor and help functions. All the teachers rated music computer-based instruction for children as 7 or higher on a scale of 1 to 10 (25 percent responded with a perfect 10 rating).

Students' Responses

Students' background information was as follows: 66 percent were aged 10 through 13; 77 percent had taken lessons from 1 to 6 years (43 percent had received from 4 to 6 years of instruction); 50 percent indicated that they used the computer for music less than 30 minutes per week; 76 percent said that computer use was required; 69 percent indicated that they used the computer once a week; 75 stated that a monitor (usually the teacher) was almost always available for help if needed. In addition, 72 percent of the students have computers in the home. Of these, 22 percent have Apples, 19 percent own IBMs or compatibles, 14 percent have Commodores, 11 percent own Macintosh, and 34 percent use other brands.

Students' attitudes toward computers indicated that 98 percent claimed that the equipment was reliable, 97 percent thought that the screen (monitor) displays looked good, 60 percent liked the sound, 95 percent approved of programs which scored student progress, and 84 percent stated that they always understood their assignment on the computer. Specific favorite programs among students showed few trends; however, students did indicate a preference for programs which were "helpful for learning," "fun," and which "look good," and offer a "variety of activities." Disliked program characteristics tended to cluster around either "too easy" or "too hard!" Favorite computer music activities listed were practicing note reading and drilling on rhythm reading. The least favorite activity listed was composition.

Other student attitudes were: 74 percent believed that they are better musicians due to computer use, 60 percent judge themselves to be better players due to computer activities, 68 percent said they like using computers at music, and 77 percent stated they like taking music lessons. In response to the question "Would a human teacher be more helpful in teaching you the same materials which the computer does?," students indicated "yes" in 27 percent of cases, 55 percent responded "sometimes," and 18 percent said "no." A similar question ("Would a human teacher be more fun in teaching you the same materials which the computer does?") generated the following: 14 percent responded "yes," 57 percent answered "sometimes," and 28 percent responded "no."

Response Comparisons

Among the teacher responses, several associations were investigated (e.g., the relationship between certain basic background information and the teachers' attitude responses) utilizing the Chi-square statistic. None of these comparisons proved statistically significant at the level of $\underline{p} > .05$.

Among students, however, several relationships were statistically significant. Certain of these relationships were not unexpected, such as the length of use required each week at the computer compared to the attitude toward taking music lessons (Chi-square = 31.51, 16 *df*), the liking of programs which use scoring features compared to liking the use of computers at music (Chi-square = 13.73, 4 *df*), liking the visual (screen) display compared to liking the use of computers at music (Chi-square = 86.31, 8 *df*), and having a home computer compared to liking computers at music (Chi-square = 9.63, 4 *df*).

Two interesting associations become apparent. There seems to be some dependency between the attitude of finding a human teacher more (or less) helpful than the computer compared with liking to use computers at music (Chi-square = 56.97, 4 *df*), and also the attitude of finding a human teacher more (or less) fun than the computer compared with liking to use computers at music (Chi-square = 26.92, 16 *df*).

In addition, several relationships were noted between responses given by teachers and by students (i.e., between group comparisons). The following relationships were statistically significant beyond the established .05 level: (a) the model of computer in the studio compared with student's perception of the screen display quality (Chi-square = 17.97, 8 *df*), (b) the amount of required student use compared with students' liking of taking music lessons (Chi-square = 43.07, 12 *df*), (c) whether a human monitor was available compared with students' attitudes toward using computers at music (Chi-square = 32.33, 20 *df*), and (d) the giving of tangible rewards for computer use compared with the students' attitude toward using computers at music (Chi-square = 30.07, 16 *df*).

Discussion

Several factors probably influenced the rather low questionnaire return rate of 38 percent:

(a) teachers had to rely on their students to complete and return the questionnaire to them; it was believed that some teachers did not respond because only three or four students had responded, and they believed this invalidated their responses;
(b) teachers at a national professional conference often feel motivated ("a professional high") to volunteer to participate in activities;
(c) it was impossible to send a "follow-up" reminder to these teachers since the investigator did not have their addresses due to the nature of the volunteering procedure;
(d) materials gathered at professional conferences (including this questionnaire packet) tend to be stacked on a shelf upon arrival back home with all of the best intentions of prompt reading.

Due to these factors, and others, the reader is asked to consider the findings from this survey judiciously, carefully inferring these results to other similar settings and situations. The following conclusions are advanced, couched in the format of "suggestions to teachers currently using or considering using computers in their music studio."

Computer Lab Setup and Administration

1. Computer labs are best housed in an area separate from the teaching studio, primarily because of noise factors. If this is not possible, teachers should select hardware and software which allow the use of headphones.
2. All of the sound-source possibilities should be investigated; many of the newest MIDI keyboards (which may be plugged into most current computers) often have excellent sound capabilities.
3. A monitor or helper (adult or older student) ought to be available most of the time when students are using the computers.
4. Assignments for computer use ought not to exceed 30 minutes per week. In particular, teachers should be conservative with time requirements for younger students.
5. Teachers should consider establishing some type of tangible reward system (e.g., stickers, pencils, etc.) for computer achievement.

Recommendations Concerning Software

1. The students' computer curricula must be carefully planned and coordinated with appropriate levels and target ages for the programs.
2. Software choices should be made with an awareness that features preferred by students include varieties of activities, a game-like approach, appealing graphics, "fun" sounds (e.g., a fanfare upon successful achievement), and scoring functions.
3. Teachers should consider carefully the purchase of at least one of the newer and more sophisticated compositional programs so that students can use the computer in a creative and artistic way. This type of software, as well as other new additions, holds the potential to change the attitudes of those who view the computer as merely a pedantic "drillmaster."
4. The computer, although exciting, is only a teaching aid—not unlike a metronome or a tape recorder. It will not likely replace the necessary human interaction between the eager young student and the enthusiastic and inspiring teacher.

In conclusion, the computer can be an effective and motivating teaching aid in music studios. Teachers can, in fact, increase their income through its use, but they will earn the additional income if they spend the necessary time planning curricula, establishing rewards, and administering the computer lab in an overall productive and professional manner.

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