AN ABSTRACT OF THE THESIS OF

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Title: Implementing Technology into the Curriculum: Assessing the Attitudes and Motivation Levels of Elementary Education Majors Toward the Integration of Technology for Learning the Basic Fundamentals of Music - A Case Study.

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This case study evaluated the attitudes and motivation levels of elementary education majors toward the integration of technology in the Basic Music curriculum. Prior to the actual case study, a pilot study was conducted in order to assess the prevailing students' attitudes toward the required Basic Music class. An historical literature review of the use of computer-assisted instruction to teach music fundamentals was completed. An instructional analysis and curriculum review were completed and suggestions were made for the integration of various technology components into the curriculum. These components include computer-assisted drill and practice programs as well as supplemental on-line materials. Improvement in student test scores was not measured. Overall, student attitude and motivation levels were positively influenced by the use of computer-assisted instructional programs. The supplemental on-line materials, which were static, non-interactive, informational pages, proved to be sparsely used by the students. Interactive, on-line quiz modules are recommended by the researcher.

Implementing Technology into the Curriculum: Assessing the Attitudes and Motivation Levels of Elementary Education Majors Toward the Integration of Technology for Learning the Basic Fundamentals of Music - A Case Study

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CHAPTER I

INTRODUCTION

Technology is rapidly advancing and pervading virtually every aspect of modern society. Evidence of this technological advancement can be seen in a variety of settings. For one, fax technology, which previously required expensive machines dedicated solely for that purpose, can now be integrated easily into a personal computer with a fax modem. Faxes can be sent directly to another computer and printed with any normal printer. This has decreased costs of maintaining an office as well as consolidating many office functions into one machine.

Another example of technology advancement can be seen in personal banking practices. Electronic transfer of funds was considered a technological wonder a few decades ago. Today, a person can do all banking, shopping, bill paying and record keeping from a home personal computer.

In office and school settings, hand-written reports gave way to typewriters which were soon replaced by word-processors. In turn, technology progressed from word processors to local computers and finally to networked computers with ever-increasing record-keeping and storage components, versatility, and file sharing abilities.

Another industry where the progression of technological advancement is apparent is in the health care field. Hospitals have begun to computerize patients' records which allows ease of retrieval and access, by authorized personnel, from any terminal within the networked computer system. Nurses, taking patient vital signs for example, can now enter that information remotely using a pocket-sized computer that immediately records the data into the main computer. Medical transcription has become more sophisticated as

well with the use of voice recognition software that allows the physician to speak directly into the computer instead of using the older Dictaphone recording equipment.

The rapid growth of technology is evidenced in the exploitation of the World Wide Web by corporations and businesses (the commercial media in general), city and state agencies, local, state and federal government offices, all types of travel agencies, and the list continues. One example of this surge of electronic commercialism can be viewed on television; virtually every commercial on television today includes a World Wide Web address at the beginning or end of its advertisement.

The World Wide Web, as it is seen today, is a direct result of the progressive interconnectivity of computer networks around the world. Office or personal computers, which previously were limited to local users, can now be linked electronically through local area networks (intranets) to wide area networks (internets). This "web" of interconnected computers, which has become known as The Internet or the World Wide Web, was once limited to military use and today has grown into, among other things, a tool for international commerce, industry and information transfer. With the prevalence of electronic interconnectivity, information can be shared instantaneously with others all around the world.

Technology is also serving to enhance the educational process. For example, electronic information transfer is widely used in University libraries. Most libraries have converted the traditional local "card catalog" to a computerized system such as NOTIS that can be searched by subject, author, keyword, or title. This provides great benefit over paper-based indexes. Gathering literature for research can also be accomplished electronically using various computerized databases, making the search for information

on various topics much easier and more efficient. One of the most common databases used for educational research is ERIC (Educational Resources Information Center). This database categorizes educationally related journal articles, original ERIC documents, dissertation reviews, etc. and gives location, author, how to obtain the document, a detailed abstract, as well as other informative details. Another popular electronic database is PsychLit, which indexes and summarizes literature in psychology and related disciplines, covering over 1300 journals in 27 languages. Electronic databases are available as CD-ROM subscriptions, housed and searched on local computers at university libraries. Now, these databases can be searched remotely via the World Wide Web.

Other uses of technology in education can be seen with interactive television (distance learning) that can link classrooms from around the world. The World Wide Web provides an abundance of sites that provide helpful educational content and resources that help teachers and students alike. Through electronic video/audio setups, a student can visit a zoo electronically, talk to astronauts at NASA, interact with students in other countries and a multitude of other educational experiences. These experiences were logistically impossible to accomplish prior to interactive television and electronic distance education.

Because of the increasing amount of technology now so prevalent in our lives, and given its increasing role in education, it is imperative that educators understand the impact of technology upon students and existing curricula. The United States Department of Education has put forth a Goals 2000 legislation which:

"...codifies a set of national education goals and provides a structure for making the federal government a supportive partner in state and local systemic reform efforts. The Goals 2000 agenda calls for a challenging set of expectations for students and for coherent, high-quality educational opportunities to meet those expectations. ...As part of their Goals 2000 planning effort, states are directed to develop technology plans describing how they will use technology to support systemic reform and to help their students achieve high standards" (U.S. Government, 1998a).

The Department of Education placed the emphasis on the use of technology within the context of accomplishing educational tasks. "Technology skills are acquired as a means to an end, and students receive practice in selecting and using various technology applications to accomplish a wide variety of tasks." (U.S. Department of Education, 1998a).

The U.S. Department of Education conducted several case studies on the integration of technology into school curricula. Based on the findings of those case studies, teachers and administrators stated several reasons for including technology. The reasons most reported included: technology supports thinking processes, stimulates motivation and self esteem, promotes equity, prepares students for the future, supports changes in school structure, and explores technology capabilities. (U.S. Department of Education, 1998b).

Of these, the second highest reported reason for integrating technology into the classroom was stimulating motivation and self-esteem. "The innovators perceived the

dramatic effects that technology can have on students' interest in class activities and their sense of their own capabilities" (U.S. Department of Education, 1998b).

Educators can use technology to enhance the learning process. Computer-assisted instruction (CAI), as part of the curriculum, provides for a variety of learning styles and greater individualization of instruction, allowing students increased remedial drill on needed areas. Simultaneously, CAI can provide more challenging drills and learning modules for those students who excel quickly and become bored with the simpler drills. Not only does computer-assisted instruction allow the student to progress at an individual pace, it also provides one-to-one interaction and immediate feedback specific to that particular student's performance. Educational institutions must keep pace with the forces outside academia by evaluating and effectively integrating technology and computer-based instructional media into the curriculum.

Computer-Assisted Instruction

Computer-assisted instruction has commonly been used in the following ways: tutorial, where new concepts are taught; simulation, where the student interacts with a computer-simulated learning environment; gaming, where the student competes with peers or with the computer; and drill and practice, where students master concepts presented in the classroom (Ottman et al., 1983, as stated in Ortner, 1990). Drill and practice programs were among the earliest example of educational software (Killiam, 1981). CAI has progressed from being simplistic and visually unappealing programs to being technologically advanced and sophisticated. Some software/hardware advancements of the 1990's include:

1. Virtual 3-D environments with discovery learning components built in.

2. CD-ROM titles with astonishingly advanced video/audio and interactive components due to its increased storage space (650 megabytes of space or more).

3. The proliferation of distance learning through the Internet and the vast resources and information available through the World Wide Web.

The type of CAI that will primarily be used for this study is Drill & Practice. This type of software presents the student with problems to be solved, checks the student response, provides feedback and keeps track of progress. For the most part, no new information is presented. Although Drill & Practice software seems somewhat archaic in light of the ever-growing amount of high-tech educational programs, it never the less is still a valuable and useful type of software. Although simplistic and non-computerized, flash cards have been used effectively in the past to drill children on their multiplication facts. This approach is still considered one of the most effective ways to ensure the repetition needed for this type of skill development.

To summarize, Drill & Practice software provides:

1. Individualized instruction allowing for various learning styles.

2. Instead of attending to the "average" level of the class, more advanced students can move on while the more remedial students are allowed to drill as long as needed before moving on. In other words, they are able to work at their own pace.

3. Immediate feedback.

4. CAI lessens peer pressure and competition among students.

5. Frees up the teacher for more individualization.

6. Maintains student progress and detailed record keeping as most CAI programs keep score tallies of each student's correct answers.

Drill & Practice programs provide the repeated drill and reinforcement needed for lower level cognitive skills and thus are specifically well suited for teaching music theory

fundamentals. "Researchers have shown that students need a great deal of practice to master the fundamentals of music" (Suppes, 1966, as cited in Jacobsen). Research has shown that achievement levels are increased when in-class group drill is replaced with individual computer-assisted drill for teaching the fundamentals of music (Kuhn, 1974; Hofstetter, 1975; Vaughn, 1978; Ortner, 1990; Goodwin, 1990; Hess, 1994; among others).

Purpose of the Study

The purpose of this study is to evaluate the effects of the addition of drill & practice and web-based computer technology into the existing Basic Music course curriculum (MU-124) upon elementary education majors' attitudes and motivation levels toward learning the basic fundamentals of music. This study is of particular importance as it is one of a very few that evaluates the teaching of music literacy, or music reading, to elementary education majors, essentially a non-musician population. The research objective is the assessment of student attitude and motivation; in contrast, the majority of related studies have focused on measuring the improvement of student scores in determining the effectiveness of computer-assisted instruction.

A thorough review of literature revealed a few studies closely related to the purpose and format of the present study. Arenson (1982) used non-music majors enrolled in a college, introductory, music theory course to study competency-based computer instruction; however, student attitude toward the technology was not measured. Ortner (1990) and Pembrook (1986) suggested positive student reactions toward learning music fundamentals via computer-assisted instruction. However, the subjects used in these studies were music majors as opposed to the non-majors used in the current study,

student attitude was not a primary research objective, and the studies used large mainframe computers instead of the microcomputer technology available today. Later studies that made use of microcomputer technology did not assess student attitude. McArthur (1992) assessed the attitudes of private studio music teachers and their students toward using microcomputer-based computer-assisted instruction in the studio and reported generally positive attitudes from students.

This study will include a pilot study to assess the existing attitudes of the elementary education majors toward the Basic Music curriculum. An instructional analysis of this curriculum will then be completed including a review of the written materials and course objectives. An evaluation of the existing commercially available computer programs for teaching music fundamentals will be completed. Special attention will be given to matching the technology to be implemented with the existing instructional objectives. The curriculum will then be restructured to reflect the integration of technology. The development of both stand-alone computer-assisted programs and web-based materials will be completed before and during the implementation process. The implementation process will be observed throughout a semester and student attitudes assessed through written and on-line questionnaires as well as one-to-one interviews.

Definitions

Basic Music Class, MU-124 - Basic Music, a required course for all elementary education majors at this mid-sized university, is designed for the preparation of the future elementary classroom teacher through the study of music fundamentals, the development of eye and ear correlation by the study of vocal music on the elementary level, knowledge and use of the piano keyboard, playing the recorder, and the analysis, singing and conducting of songs. Successful completion of this course or MU-124TO: Basic Music Test Out is pre-requisite for enrollment in MU-344: Music for the Elementary Teacher. These courses are in accordance with the State of Kansas' requirement for the inclusion of music training in elementary teacher preparation programs.

CD-ROM – Compact Disc-Read Only Memory. An electronic storage medium that allows for large capacity storage which is cost effective and portable. Each CD-ROM will hold a minimum of 74 minutes or 650 mb (megabytes) of digital information.

Computer-Assisted Instruction (CAI) – Sometimes synonymous with computer-based instruction (CBI). CAI is the most current term for teaching with computers: the utilization of programs that teach students new information (tutorial programs), reinforce concepts they have learned previously (drill & practice programs), or change their attitudes in some predetermined way (simulations - problem solving programs).

Drill and Practice - For the most part, the programs used in the present study are considered drill & practice software. The computer presents the students with problems to be solved, the computer checks the answers and keeps track of progress, and for the most part, no new information is presented.

Effectiveness – As related to computer-assisted instruction, effectiveness has been defined in several different ways. Niemiec & Walberg (1987) summarized that the most usual definition of effectiveness includes measurably enhanced achievement; however, they asserted that other definitions have been employed by various researchers. For example, heightened affective responses (motivation) or better attitudes are other common definitions of effectiveness. The authors further maintained that if achievement and affective responses are held constant across comparison groups, then reduced learning time could become an alternate definition. Finally, they reported that if knowledge is retained longer and skills attained decay less rapidly than in conventional instruction, then the treatment can be considered effective. An operational definition of effectiveness as related to the present study deals with increased student motivation. The results will be considered positive if student motivation increases and/or student attitudes improve as a result of the technology implementation. Reduced learning time will also be considered a positive outcome.

Web-Based Materials – Web-based material may be broadly defined as any educationally useful information electronically accessible via the Internet (World Wide Web). Specifically, a class web page, which includes study guides, supplemental information, and hyperlinks to helpful music sites, will be available to students via the Internet at: http://www.emporia.edu/www/idt/musform/basicmus.htm

Student Satisfaction – In this study, student satisfaction levels will be defined as follows: By the observable interest levels and positive or negative attitudes displayed by the students toward the computer programs, the Basic Music class materials in

general, and the content and delivery of the class as a whole. In addition to observation of the students, the students will be polled as to their opinions of each aspect of the class and the implementation of technology into the curriculum.

Thesis Organization

Chapter one includes the introduction, purpose and relevance of the study and definitions. Chapter two contains an historical literature review of the use of computer-assisted instruction in music. Chapter three includes the methodology and procedures to include the pilot study, the instructional analysis and technology evaluation, and the restructuring of the curriculum. Chapter four embodies the actual case study of the implementation of the technology components into two sections of the Basic Music, MU-124, class with data collection through interview, observation and written questionnaires. Chapter five contains results, conclusions and recommendations. Appendices follow chapter five.

CHAPTER II

REVIEW OF RELATED LITERATURE

Introduction

The use of computers to assist learning grew out of the early works of B. F. Skinner and the idea of programmed instruction. In the 1950's, Skinner was engaged in establishing principles of self-paced or individualized instruction (programmed instruction) which emphasized drill and immediate reinforcement of each step of the learning process. Computer-assisted instruction (CAI) evolved from combining elements of Skinner's programmed instruction with the "teaching machine" invented by Sidney Pressey in the 1920's (Goodwin, 1990).

Use of CAI in music has spanned three decades. The computer has been used in ear training (including aspects of melody, harmony, and rhythm), sight-reading, rhythm perception, teaching theoretical rudiments, as an aid in the study of instrumental performance, (e.g. fingering, articulation, phrasing, and rhythm), keyboard skills, and composition (Upitis, 1983).

Out of the ever-growing concern for individualized instruction to accommodate various learning styles and in accordance with behaviorist principles of drill and immediate reinforcement, computer-assisted instruction has received a lot of attention as a potential educational tool. There are four commonly accepted types of computer-assisted instructional programs: tutorial, simulation, gaming software, and drill and practice.

Of these, drill and practice has proved to be the most applicable for teaching the fundamentals of music. As Goodwin states (1990), "One of the kinds of instruction to

which computers were first assigned was drill and practice. Teaching procedures, which include extensive drill, have some unpleasant connotations. However, the process of drill and practice is fundamental to the learning process in many situations, and this type of CAI is especially suited to teaching some of the fundamentals of music notation" (p. 30). Drill and practice software usually gives the student repeated practice on lower level cognitive skills. Note-reading programs, as an example, usually assume that the student has some prior knowledge of the content and is seeking primarily to refine existing skills. As previously mentioned, drill and practice software is strongly based on behaviorist models of learning which include stimulus, response, and reinforcement.

Historical Review of CAI in Music

Mainframe Computer Technology

Early studies which involved CAI in music began in the late 1960's. Researchers used large and expensive, albeit powerful, mainframe computers to accomplish data collection. The term mainframe originally referred to the cabinet containing the central processor unit or "main frame" of a room-filling computer. This large computer housed batch files and computer programs that could be accessed from remote terminals, sometimes called "dummy" terminals due to their lack of independent function. These terminals were little more than monochrome monitors that displayed the information kept on the mainframe.

One of the earliest research studies was undertaken by Kuhn and Allvin (1967) at Stanford University. This study used digital-to-analog converters to allow students to sing into a microphone and have the computer, an IBM 1620, evaluate the intonation and provide feedback. Kuhn and Allvin reported that students showed increased pitch

awareness as well as a positive interaction with the computer. Although this study showed a promise of significant reduction in learning time, it made no attempt to relate this to cost-effectiveness which at the time was a considerable factor in wide dissemination (Vaughn, 1977).

Another early study that used a large mainframe computer was conducted by Diehl (1971) at Pennsylvania State University. An IBM 1500 displayed musical examples, played prerecorded tapes, and trained the students to recognize discrepancies in phrasing, articulation and rhythm by comparing seen and heard versions of the musical examples. Comparison of pre-test and post-test scores of 25 instrumentalists indicated significant gains both in aural discrimination and in performance. Although this study demonstrated CAI to be effective, it was limited to trained musicians in the field of performance studies. According to Hess (1994), the primary drawback to these early, mainframe-based systems were their limited availability (one mainframe being used for an entire organization) and cost.

Several important studies were reported in the early 1970's. Von Feldt (1971) compared a traditional classroom method versus a CAI program for teaching the fundamentals of music notation to seventh-grade general music students. He concluded that CAI is as effective as teacher classroom techniques especially when teaching students with initially low achievement scores; teacher classroom technique, however, is superior when considering students with initially high achievement scores. Although Von Feldt did not report that the CAI was superior in teaching the information, he concluded that the computer program taught the information equally as well, but in 30% less time; thus he considered it an effective mode of instruction.

Of particular importance was the PLATO computer-assisted instruction system, a mainframe computer used for educational research in the early 1970's. "The PLATO computer was a powerful, but costly system for instructional development. As late as 1981, the cost per terminal was $3,800 per year..." (Hess, 1994, p. 7). PLATO, though no longer in general use, remains the largest database of CAI of all types in the world (Hess, 1994). A study by Placek (1974), which will be discussed later in this review, was one of the first projects using PLATO in conjunction with music instruction.

Recognizing the importance of drill for teaching music fundamentals and observing how much class time was being used for drill, Kuhn (1974) developed and tested a system to aid in the teaching of ear training at Stanford. He reported that the program proved very useful as an instructional supplement in teaching music fundamentals and ear training. In addition, the students showed a favorable response.

Making further use of drill and practice, Hofstetter (1975) developed a computer-based dictation system named GUIDO (Graded Units for Interactive Dictation Operations) at the University of Delaware. GUIDO, a basically linear, competency-based program, was made available to the University of Delaware through the PLATO system at the University of Illinois and made excellent use of the PLATO system's features (Vaughn, 1978). Having better graphic capabilities (512 by 512 pixels) than its predecessors, this system was considered a landmark for CAI and remained state-of-the-art until the Macintosh was introduced in 1983 (Hess, 1994). Specifically, GUIDO was a set of ear training drill and practice programs including graded sets of exercises in intervals, melodies, chord qualities, harmonies, and rhythms. This system, in addition to

providing the required drill and practice, kept records of student learning patterns for use in research in music education.

Hofstetter (1975) also reported that CAI could make a significant impact on student achievement in harmonic dictation in freshman ear-training classes. In discussing Hofstetter's work, Ortner (1990) stated that these "computer-based techniques resulted in improved motivation for learning aural skills, lowered levels of frustration for both slow learners and bright students, and competition with peers was minimized" (p. 35). GUIDO is still used at the University of Delaware and other GUIDO subscribers, e.g. the University of Nebraska at Omaha (Hofstetter, 1977).

With the microcomputer revolution of the middle 1970's, the number of studies regarding the integration of CAI into the curriculum steadily increased. Technology continued to advance, educational software development increased and hardware costs decreased, making computers more affordable and software more accessible to educational institutions. According to Niemiec and Walberg (1987), it was estimated that, by the mid 1980's, 90 percent of American schools used computers in instruction. Although the advent of the microcomputer resulted in technological advances, most educational research was still making use of mainframe computers. It was not until the early 1980's that microcomputers found a place in educational research.

A landmark for the professional growth of CAI in music occurred in 1975 when representatives of eleven universities met on the campus of University of Delaware. With the importance of computer-based music instruction becoming apparent, leading researchers joined together to form the National Consortium for Computer-Based Music Instruction (NCCBMI), a special interest group of the Association for the Development

of Computer-Based Instructional Systems (ADCIS). Its stated goals were to provide a forum for developers, maintain a library of music courseware, reduce redundant efforts among developers and to assist new users of music CAI (Eddins, 1981).

In 1978, Vaughn contrasted computer-assisted instruction and the traditional classroom method of instruction in the Basic Musicianship classes at Oregon State University. Both the experimental and control groups received the same classroom instruction but the experimental group also received at least eight hours of CAI to reinforce the classroom learning. Vaughn concluded:

> Computer-assisted instruction was a better medium than the traditional classroom for the teaching of the ear-training skills found in basic musicianship. Analysis showed that significantly more growth occurred when students utilized the computer for their ear-training study than when they did not. A significant growth in achievement was found in all areas of computer instruction – melodic, harmonic, and rhythmic (pp. 81-82).

In addition to finding an increase in academic growth, Vaughn also found that this occurred in considerably less time. He stated that, at least in part, the general increase in academic achievement resulted from the fact that weaker students could drill as much as they needed (including after class) if necessary.

During the late 1970's (1978-81), North Texas State University developed the Automatic Music System (AMUS), a complete CAI system for ear training, sight-singing, keyboard, part-writing, and analysis. This system was interfaced into a large time-sharing mainframe and was intended to serve 600 undergraduate students. The purpose of the AMUS program was to correlate with, support, and reinforce the student's

experience in the classroom (Eddins, 1981). Goodwin (1990) describes a study completed at North Texas between 1976-77 using the AMUS program, which compared classroom instruction combined with reinforcement by CAI versus classroom instruction combined with reinforcement using a few non-CAI mediums. According to Goodwin, the researchers found greater achievement in the CAI group. A vital part of the AMUS system, as well as GUIDO mentioned above, was the saving, storing and processing of student response data. New research possibilities in the areas of musical perception, learning styles, and curriculum development became available due to these systems' ability to collect detailed data (Walker, 1995).

Ottman et al (1983) completed a study, also using the AMUS system, and found that CAI was effective for drill and practice because it provided immediate evaluation and feedback of student response (as stated in Ortner, 1990). Ottman reported that, in order to make the most effective use of time, aural concepts should be presented in the classroom, with student competence and mastery developed through individualized CAI (Eddins, 1981).

Hofstetter (1981) continued his studies of competency-based instruction and CAI. Having already established the effectiveness of CAI in teaching ear training and dictation, Hofstetter compared two types of drill and practice computer programs, one that was competency-based and one that was a linear sequential program. In this study, he found the "testing" feature of competency-based instruction to be superior to the linear drill and practice program. Hofstetter stated that, "students using the competency-based approach scored significantly higher than those students who used the open-ended type of drill and practice" (p. 91). In this context, competency-based instruction allowed the

students to quickly move past the sections with which they were comfortable. In turn, they could then concentrate on weaker areas as opposed to the sequential type of drill and practice that caused each student to spend approximately equal amounts of time on each unit before moving on. The researcher reported that students using the computer-based drill program showed improved motivation and lowered levels of frustration in learning aural skills. In addition, students appreciated the minimization of peer pressure and competition (Ortner, 1990).

Watanabe (1981) investigated the application of a self-authored, PLATO IV, drill and practice type CAI program. The purpose of the study was to use a CAI program to teach aural identification of musical instruments. The researcher used an experimental group of thirteen subjects who received CAI and a matched pair control group that received traditional instruction. "Watanabe reported there was no significant difference between the group exposed to the CAI programs and the group receiving traditional instruction" (Jacobsen, 1986, p. 13).

Dealing less with ear training, Gross & Foltz (1981) did an extensive CAI project in college level music using CAI to teach basic music fundamentals. Their findings "indicated a dramatic improvement in achievement in understanding music fundamentals such as music notation and music terms for students using CAI as compared to non-CAI courses" (Ortner, 1990, p. 37).

A new system, MEDICI (Melodic Dictation Computerized Instruction) was developed at the Center for Music Research at Florida State University. Taylor (1982) tested the effectiveness of a CAI melodic dictation program using MEDICI as compared to traditional classroom group melodic dictation. The author pointed out even though the

study did not demonstrate the MEDICI program to be necessarily superior (in regards to the pretest-posttest scores), it was just as effective as classroom instruction. In addition, he felt that "MEDICI was clearly the more efficient method, since it served to remove a rather boring and perfunctory activity from the classroom" (as stated in Goodwin, 1990, p. 39).

Pembrook (1986) found mixed results in his study of college students utilizing the MEDICI melodic dictation program written for the PLATO system. Some students felt the instruction took too much time, was not enjoyable, and did not provide adequate feedback. Those students believed ear training in the traditional classroom provided more prompt feedback than the computer. Other students thought the computer program taught ear training equally as well as traditional forms of teaching. Pembrook reported CBI has been viewed favorably by teachers for replacing teaching time normally devoted to drill and practice. The study also proposed the notion that college students like graphic positive reinforcement from the computer in such forms as happy faces.

In 1992, Dalby designed and developed the Harmonic Intonation Training Program (HTTP) using the PLATO Interactive Music System (IMS). This program was designed to teach college students harmonic intonation skills. The experimental group worked with the program for 45 minutes twice a week whereas the control group completed classroom sessions only. Dalby concluded that CAI was effective for teaching harmonic intonation skills and deemed it even more effective since it provided training without wasting a lot of classroom time.

In 1982, Arenson compared pre-test and post-test results of non-music majors in a college introductory music theory course. He concluded that competency-based

computer instruction was superior to homework assignments in providing the drill and practice necessary for success in learning music fundamentals (Ortner, 1990). Arenson stated the competency-based program was not likely to ensure feelings of self-confidence, even in the best of students, due to the program's four-second time limit for answering each question. This, he stated, was especially true with non-majors who would naturally be less secure in melodic dictation. The researcher further stated the frustration level of the non-majors negated, to some extent, the success of the competency-based approach.

Another study comparing CAI to a traditional classroom approach was completed by Shannon (1982) using two intact groups of a freshman music theory class at two different schools as experimental subjects. This study compared a CAI program in drill and practice of aural-visual interval recognition to a traditional classroom approach of ear training and reported CAI was not as effective as the traditional approach. Although the reasons for this negative result are not readily apparent, the researcher does mention a slight difference in age and musical backgrounds between the groups. She adds that there was also a difference in the number of declared music majors, with a higher percentage belonging to the experimental group (Shannon, 1994).

In summary, mainframe studies centered primarily around the computer's effectiveness in teaching ear-training to music majors. These early studies laid the theoretical foundation upon which further studies were based, including the studies which looked at the microcomputer for use in education. The mainframe studies also provided the ground-work for the use of computer-based, drill and practice programs for reinforcing the learning of music fundamentals. Although these studies showed positive

results toward the use of computer-assisted instruction in music, they were primarily limited by cost and availability of the mainframe computers.

Microcomputer Technology

In 1983, two important developments occurred. The first was the Musical Instrument Digital Interface (MIDI) which allowed individual synthesizers (primarily keyboards) to communicate with other MIDI instruments and likewise be able to communicate with a computer. This allowed much better audio sound quality as well as serving as an improvement over the older input devices such as light pens, etc.

The second major development was the advent of the Macintosh, which introduced a Graphic User Interface (GUI), for microcomputers, making this one of the first systems available to the general public. Although microcomputers were first introduced in the 1970's, the video was limited to monochrome with the only input device being the keyboard. The GUI allowed for enhanced video with more colors and pictures (icons) resulting in a more appealing and functional interface. The Macintosh was the first to provide a combination of input devices (mouse in addition to the keyboard) which allowed for a more comfortable, "user-friendly" feel.

As technology continued to advance, the microcomputer, with the aforementioned enhancements, began receiving more attention. Not only did the microcomputer provide improved graphics and more efficient interactivity, the cost of maintaining these systems was significantly lower than the older, larger mainframe computers. As costs decreased, hardware and software became more accessible to educational institutions. Researchers began studying the effectiveness of the microcomputer for use in educational settings.

Several studies coincided with the technological advancements of the early 1980's. Using the Apple II+ microcomputer, Deal (1985) used two groups of college music education majors to compare a traditional programmed text format with a computerized version of the same programmed text for accomplishing rhythm and pitch-error detection tasks. The results indicated significant gains for both groups, but no significant difference between groups.

In a synthesis of reviews of computer-based instruction in all fields, Niemiec and Walberg (1987) concluded the majority of comparative studies favored computer assisted instruction over traditional study. However, it was suggested that computer assisted instruction decreases in effectiveness as the age of the user increased. In addition, it was reported microcomputers have proven more effective than mainframe computers (Ortner, 1990).

A microcomputer-based study comparing computer drill versus classroom drill was completed in 1989 by Willett and Netusil (as cited in McArthur, 1992). The authors contrasted the two approaches within the context of bass clef notation reading by fourth grade students who were classified as field dependent, field independent, or neither. They reported the computer group achieved superior gains over the traditionally instructed group.

Goodwin (1990) studied the effectiveness of *Tap Master* compared to traditional classroom methods in teaching sight-singing to college music students. Over a period of seven and on-half weeks, students in the experimental group left the class and spent twenty minutes twice a week using the computer program. The control group stayed in the classroom and worked with the instructor on the same materials. It was concluded

that the *Tap Master* was more effective in developing sight-singing skills than the traditional classroom method. Goodwin, pointing to an oversight by previous researchers, suggested that although several studies had compared CAI with "traditional" classroom methods, no attempt had been previously made to specifically define "traditional" as it applied to the classroom.

Another study was accomplished by Ortner (1990). This study compared CAI to the classroom method of teaching concepts of rhythm. In this study, Ortner asked the experimental group to spend a minimum of forty minutes working on the computer program (The Magic Piano) in addition to regular class time. After finding no significant differences in pre-test and post-test scores between the experimental and control groups, he concluded the treatment period of six weeks may have been too short a time to achieve large enough learning gains. He did report that since a few students in the experimental group did improve their rhythm skills beyond the instructor's expectation, computer assisted drill may be effective for some students and less helpful for others.

One study, Bresler & Walker (1990), had a very similar goal/methodology, making it significantly relevant to the present study. Bresler & Walker completed a case study of the implementation of computer assisted instruction into an existing first year music theory course. "The study took place at an affluent private university located in the midst of a thriving high-tech industrial community with a computer-sophisticated group of students" (p. 67). The software used *was Music Master*, an Apple II-based, student-controlled program in music theory and ear training that allows the student to choose which exercises they wished to do. The researchers summarized the following reasons to expect successful implementation (p. 68):

1. Adequate hardware.
2. Appropriate software.
3. Institutional commitment.
4. Well-established program within the course.
5. Instructor who supported, and knew how to use, computers for music instruction.
6. Students who were interested in learning what the computer system taught and had mostly favorable attitudes toward computers.

Even with these favorable signs, the researchers reported the computer program was barely used by the students outside of class. In addition, the CAI was never used in class-related activities and was not even mentioned after the first day of class. Out of 38 students, only 17 came to the computer room. Of these, only five came to the lab more than once and only three came often enough to get significant ear-training (p.69). The researchers concluded it was necessary to make the CAI a requirement (rather than an optional embellishment) when integrating it into the formal curriculum. In light of the CAI being optional, the researchers stated it was necessary to have the students enjoy the program. They suggested possible causes for the students' lack of interest as follows:

> "This drill and practice program required repetitive work and perseverance. The screen and visual information was unimaginative and plain (in part due to computer memory problems), and the musical content was presented in the abstract—musical elements such as scales, intervals and chords, rather than melodies. Most elements that make games entertaining were absent" (p. 70).

McArthur (1992) did a survey type study that assessed the attitudes of 24 private studio music teachers and 106 of their students. The researcher sought to "investigate

certain marketing claims made by some companies seeking to sell hardware and software to private music teachers" (p.26). Specifically, the marketing claims stressed the following:

1. The computer's effectiveness of the computer as both a teaching tool (tutorial) and as a practice (drill) tool;

2. The computer's inherent motivating qualities which spur young students to "have fun while learning music."

Although the returned questionnaires showed generally positive attitudes from students and teachers alike, McArthur reported the teachers' most frequent responses to the question regarding problems in the set-up and administration of the lab included (p. 27):

1. Lack of adequate space;

2. High noise level (If the equipment was located in the teaching studio and the students did not use headphones);

3. 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.

McArthur makes recommendations, based on the above information, concerning computer lab set-up and administration as well as recommendations concerning software selection and evaluation.

Chappell (1993) studied the effects of CAI in aural acuity of seventh-grade, instrumental music students over a treatment period of five weeks with the students having two ten-minute sessions per week. Her research showed no significant difference between CAI and classroom methods, although she attributed this to the need for a more extended treatment period to accurately assess pitch discrimination skills. She also suggested that the use of several different programs in CAI could serve to enhance total sight-singing ability and reduce boredom.

Hess (1994) conducted a study, deemed particularly relevant to the present study, at the University of Northern Colorado utilizing two sections of the freshman music theory class. A curriculum-specific, computer-based program was used to replace all in-class drill in intervals and chord identification for one section. A second section used commercial software as a supplement to traditional in-class drill. The purpose of the study was to determine whether aural skills can be taught as effectively through the exclusive use of a curriculum-oriented, computer-based tutorial and drill program, as when taught by traditional in-class dictation drills coupled with the optional use of commercial software. Hess found no significant difference in achievement or attitude between the two approaches; however, the results indicated that the computer provided more efficient and consistent instruction.

In a recent study, Walker (1995) studied the effectiveness of the Music Lab Series program as compared with a classroom-only approach for teaching sight-singing and ear-training skills. A comparison of pre-test scores showed no significant difference between the control and experimental group. The researcher concluded (p. 47),

> "While little can be said about the effectiveness of the MLS as a pedagogical tool based on this study, it is obvious from the opinion survey that the enjoyment level of those students in the experimental group was much higher than those in the control group. This would seem to indicate the MLS can be an effective motivational tool for instructors and provide valuable drill and practice".

In summary, researchers refocused their attention on studying CAI's effectiveness in the classroom using microcomputer technology in place of the mainframe systems. These studies not only showed microcomputer-based CAI in music instruction to be

effective in increasing student achievement levels, but CAI using microcomputer technology proved to be much more affordable and manageable than the large, costly mainframe systems. As computer technology became more affordable to educational institutions, the development of educational software flourished and, in turn, researchers' interest in studying CAI continued to thrive.

CAI, Music and Elementary Education Majors

Two studies reviewed used elementary education majors as subjects. The first, an earlier study, was one of the first projects to use the PLATO mainframe system in conjunction with music instruction. This study, conducted by Placek (1974) at the University of Illinois, used elementary education majors as subjects with a computer-assisted lesson in rhythm. Placek designed and programmed the CAI lesson, tested it, and interviewed the students upon completion. In addition to achieving learning gains, the subjects "expressed great approval of the audio-visual potential of the system including the personalized responses and the immediate accessibility of musical examples" (Vaughn, p. 22-23). The students valued the immediate feedback given by the computer in a relatively confidential manner as well as the computer's ability to define a task, demand input, and quickly judge the response. Placek concluded that CAI in music was feasible and music educators should become involved in the preparation and use of materials for such instruction.

Six years after conducting his first study using a self-authored CAI lesson in rhythm with prospective elementary teachers as subjects, Placek (1980) expanded upon the early positive findings. He continued his research by developing a model for integrating CAI materials into the actual curriculum. Placek stated one of CAI's unique

properties was providing alternative teaching strategies such as drill and practice. (as cited in Ortner, 1990).

Jacobsen (1986) studied the "effectiveness of CAI when used to provide drill and practice in music fundamentals to elementary education majors" (p. 43). Using four intact sections of the *Music Fundamentals and Experiences* class, the researcher randomly selected two sections, consisting of approximately 25 to 30 students each. The CAI program used was the Minnesota Educational Computer Corporation (M.E.C.C.) Music Theory program, Volume I, version 2.0. This program was selected after the researcher reviewed 27 different programs at the Colorado Music Educators Association Convention in 1985. Jacobsen included a software assessment survey questionnaire which he used in the selection of the M.E.C.C. program.

Regarding the study, Jacobsen states (p. 47):

> "The two experimental groups received the traditional classroom presentation of the fundamental music concepts and cognitive material for two of the three class meetings per week. The third class period was spent in the computer laboratory receiving drill-and-practice in these same music fundamentals using the CAI program. The amount of time each student spent on the computer each week was limited to the third hour normally used for classroom instruction. The classroom instructor acted as monitor during the computer sessions to ensure each student worked alone and had no problems with the CAI program."

Only those students in an experimental group were allowed access to the CAI program. A numbered disk was assigned to each student and the students were not

allowed access to the CAI program outside normal class time. The researcher added a competency level (80%) that each student had to attain on each CAI routine before being allowed to move forward to the next routine. Of the 18 routines on the CAI program disk, the students were asked to work on specified routines to the exclusion of all others until the competency was reached.

Jacobsen specifically tested the following content areas: Note Types, Counting, Note Names, Key Signatures, and Rhythm. The researcher concluded "that the computer assisted instruction method used in the study was as effective as the traditional teacher/classroom method in the content areas titled Note Names, Key Signatures and Rhythm" (p.78). He also concluded, in the content areas of Note Types and Counting, the traditional method was more effective than the CAI method. Jacobsen suggested that "CAI can be only as effective as the teacher who designed the program. At best, a CAI program would be as effective as a teacher" (p. 78). Thus, Jacobsen concluded CAI programs work best as a supplement to traditional methods and should continue to be used in this ancillary fashion.

Student Motivation and Attitudes

Several studies reviewed included an attitude assessment component, although all researchers who assessed student attitudes or student motivation did so as a secondary research objective. Since the assessment of students' attitudes and motivation is a primary research objective of the present study, the following studies and their results are particularly relevant.

Several of the early mainframe-based computer studies assessed student attitudes toward computer use. Kuhn and Allvin (1967) reported a positive student-computer

interaction at the college level. Kuhn (1974) noted the use of a drill and practice program to teach ear training at Stanford produced a favorable response from the students involved.

Placek (1974) interviewed elementary education majors at the University of Illinois who expressed positive attitudes toward working with the PLATO computer. The positive aspects, according to the students, included grading confidentiality, immediate feedback, nice graphics, and variation of examples. The students also appreciated the program's attempt to inject humor as part of the feedback process.

Computer-based drill and practice reduced frustration levels and improved motivation for college music majors learning aural skills as reported by Hofstetter (1975, 1981). In addition, the students reported, when using the computer for drill, competition with peers was minimized, allowing a more relaxed learning environment for those who needed more drill.

Pembrook (1986) reported some students found the mainframe computer (PLATO) system to be inadequate in providing feedback. They also stated it was not enjoyable and instruction took too much time when using the computer. Conversely, Pembrook reported some students liked graphic positive reinforcement for the computer (i.e. happy faces). In addition, the teachers involved favored the computer-based instruction for replacing classroom time typically devoted to drill and practice.

Bresler and Walker (1990) reported the students involved in their case study initially showed interest in learning with computers and had mostly favorable attitudes toward computers. However, most of the students made little use of the computers once the study was undertaken. The researcher stated possible causes for the lack of student

interest to include unimaginative screen and plain visual information as well as the absence of entertaining gaming elements in the program.

McArthur (1992) reported generally positive attitudes from both students (seventh graders) and teachers. She suggested the use of several different computer programs in CAI, in order to reduce the risk of the students becoming bored.

Walker (1995) reported increased enjoyment levels of the students using CAI for drill and practice in ear training. He suggested that CAI programs (*Music Lab Series* in particular) can be an effective motivation tool as well as providing necessary drill and practice.

In summary, studies that included an attitudinal assessment reported positive findings. In the early mainframe studies, researchers more frequently reported high levels of student motivation than in the later microcomputer-based studies. This may have been due to the novelty of CAI in music at those times. Conversely, the later microcomputer-based studies reported positive student response to the enhanced graphic and sound capabilities. In general, regardless of the type of computer hardware, the use of computer-assisted instruction has received a generally positive reaction from students and teachers alike.

Summary

The early mainframe studies, dating from the late 1960's and dominating the 1970's, served to establish the effectiveness and utility of computer-assisted instruction for teaching various fundamentals of music. Major drawbacks of the mainframe systems included the high cost of maintenance, the enormity of space needed to house them, and the lack of sophistication regarding the graphic interface and input devices.

The advent of the microcomputer in the 1970's not only made computer technology more affordable to educational institutions, but spurred an increase in educational software development. Studies which previously included research on the effectiveness of CAI using the large mainframe computers were re-accomplished in order to test the effectiveness of CAI in conjunction microcomputer technology. These studies concluded that the use of CAI in music instruction not only proved to be effective in increasing student achievement, but also proved to be an affordable and efficient educational tool when used in conjunction with classroom instruction.

The purpose of this thesis is to implement several types of technology, including computer-based drill and practice programs, into an existing traditional, classroom-oriented curriculum for one complete semester. The method chosen for this project is that of a case study approach, the goal of which is to determine the successful and/or unsuccessful components of the restructuring process. One study, Bresler & Walker (1990), completed a case study of the implementation of computer assisted instruction into an existing first year music theory course. Not only did this study serve as a guide in implementing the case study approach, it provided a means whereby, through its limitations and conclusions, to avoid similar problems that may be encountered in the current study.

One of the proposed curricular changes for the present study is to implement a combination of commercial software and self-authored CAI to replace all in-class drill. Hess (1994) conducted a study, deemed particularly relevant to the present study, which compared and contrasted the use of a curriculum-specific, self-authored, computer-based program with the use of existing commercial software as a supplement to traditional in-

class drill. The findings of his study influenced the decision to include both commercially available software for drill and practice as well as self-authored, curriculum specific, computer programs in the present study.

Walker (1995) completed a study, also deemed quite relevant to the present research project, which dealt with the ear training and dictation portions of music fundamentals whereas the present study will target the written aspects of music notation fundamentals. Walker's research is similar to the present study in that it was conducted at Emporia State University, as was the present study, and utilized a similar sample population (i.e. students enrolled in the Basic Music class). One of the conclusions drawn by Walker was the possible negative effect of a small sample population. This researcher has chosen to use two intact sections of the Basic Music class (N=40) instead of the smaller sample size (N=15) used in the previous study.

CHAPTER III

METHODOLOGY AND PROCEDURES

Pilot Study: Attitudinal Survey

Purpose

The primary purpose of this case study is to determine the affects of the introduction of CAI technology into the MU-124: Basic Music course curriculum by assessing the attitudes and motivation levels of elementary education majors. The pilot study was conducted to assess the pre-existing attitudes of elementary education majors toward the Basic Music class, its content, and how it was taught. In order to accomplish this objective, a pilot questionnaire was developed, distributed and evaluated in an attempt to collect data regarding the students' opinions about needed changes. The questionnaire also included sections regarding demographic information and prior musical experience.

An on-line questionnaire approach for the attitude survey was selected for the following reasons:

(1) Cost effectiveness. On-line questionnaire approach eliminated the need for expensive postage.

(2) Time management. The immediacy of the electronic response was favored over the time consumption of each participant having to fill out the paper questionnaire and mailing it.

(3) Target of specific audience. The elementary education majors, who used the computer lab for their other education classes, continue to use e-mail and Netscape on a regular basis. These students are the target audience and are readily accessible

participants. The on-line questionnaire provides them the convenience of easy access and allows them to use the previously learned computer skills.

Setting

The Basic Music class is a required class for elementary education majors and has previously been taught in a traditional lecture-based approach with non-computerized, in-class drill. The students are required to learn the fundamentals of music notation in preparation for Music for the Elementary Teacher, the subsequent mandatory music course, which focuses on methods of teaching music and incorporating music into other activities of the elementary classroom. In addition, students must attain proficiency on the recorder and demonstrate this in several playing exams.

The description of the Basic Music course, as listed in the course syllabus, is as follows:

> Basic Music is designed for the preparation of the future elementary classroom teacher through the study of music fundamentals, the development of eye and ear correlation by the study of vocal music on the elementary level, knowledge and use of the piano keyboard, playing the recorder, and the analysis, singing and conducting of songs. Successful completion of this course or MU-124TO: Basic Music Test Out is pre-requisite for enrollment in MU-344: Music for the Elementary Teacher.

The pilot study was conducted during the 1997 spring and summer semesters at Emporia State University, a medium-sized, mid-western university of approximately 5,230 students. The test group included male (10%) and female (90%) elementary education majors who had completed the required Basic Music course, MU-124, within four prior academic semesters. These students' classifications ranged from second-semester freshman to senior. The elementary education majors involved in this pilot study were those who regularly used a computer laboratory located in The Teacher's

College. Several of the other required courses for these students have been held in the computer classroom; thus, the students were familiar with the computers, the Internet and technology in general.

Procedure

An explanation document was created that included information about the study as well as the Internet address of the on-line questionnaire. (See Appendix A for document, Appendix B for questionnaire.) This document was distributed to the elementary education majors that were taking IT-125 "Microcomputers in the Classroom" (three sections), another degree requirement. Completion of the questionnaire was optional. Extra documents were also available in the computer lab and, as elementary education majors were identified by the researcher, they were also asked to consider participating.

Description of the on-line form

The students were given an explanation form with the Internet address of the on-line questionnaire form (http://www.emporia.edu/www/idt/musform/post.html). Students had the option to fill out one or all of the questions on the form. The form was designed to be anonymous with no limit placed on the amount of information contained in each answer box. Upon submission of the electronic form, the results were electronically sent to the researcher via campus electronic mail. This account was established with the assistance of the campus Computing and Telecommunication Services Department (C.A.T.S.). The results were then analyzed by the researcher.

Results

Sixty-four students were invited to participate in this pilot study. The selection process was accomplished through random one-on-one interaction between the student and researcher or via a class announcement made by the researcher. In addition, the researcher elicited the help of two professors, who were requested to make an announcement about this project in their classes. However, since the researcher was not present during those class sessions, it is uncertain whether these students were actually given the information.

Responses were received from 18 of the original 64 students asked to participate in this study. The low response rate was an unexpected finding. The convenience of the on-line method of questionnaire delivery (versus paper-based surveys) did not improve participation as much as the researcher had anticipated.

A possible explanation for the low number of respondents might be due to problems with the CGI-Bin and scripting set-up. The university network was down at various times during the data gathering process which prevented the questionnaire results from being mailed electronically. A subsequent problem with the CGI-Bin storage prevented retention of information gathered the questionnaire forms. Although this problem was corrected, the technical difficulties made it impossible to determine the number of surveys lost during this time. Detailed results of the survey may be found in appendix C.

Results of the survey convey an overall negative attitude of the elementary education majors toward the Basic Music class. The following results are summaries by the researcher of specific comments made by the students on the questionnaire.

1. *Students were unclear about the relevance of the class to their future plans* - Many of the students seemed resigned to the fact that they "would never need to teach music in the elementary setting since a Music Specialist was always available." The students further stated they would not accept a job where they had to teach music. Thus, since the prospect of having to teach music as an elementary teacher was not a reality to the students, they generally felt that the Basic Music class was an unneeded and unwanted curricular requirement.
2. *Dissatisfaction with playing the recorder* - When asked about their opinion of the content of the class, 6 students (33%) stated that they felt the recorder requirement should be eliminated. Comments by the students included such things as: "Why should I have to play the recorder? It's a stupid instrument and I'll never play it again." "I played the recorder when I was in second grade...why do I need to learn it again?" When the students were asked what they would change about the Basic Music class, students again suggested removing the recorder component. Two other students suggested that if the recorder requirement remained in effect, more practice on the instrument was needed.
3. *Students with prior music study were bored* - The survey results showed a direct correlation between the level of an individual student's prior musical experience and his/her interest in the content of the class. For example, seven of the respondents had participated for three or more years in two or more ensembles (or played two or more different instruments). As a result, these students felt the class to be "too easy", "boring", "not useful", and/or "a waste of time." Of the seven, 3 students were unaware of the test-out option and felt this option should be publicized to a

greater extent. However, the remaining 4 students chose to take the class instead of taking the test-out option to ensure they had all the prerequisite knowledge for Music for the Elementary Teacher.

4. *Students with little or no previous music training were overwhelmed* - The students with little or no prior musical experience reported the class to be "difficult", "confusing", or "too much to learn". Four students reported having limited musical experience (membership in one performing ensemble) and 4 students related having no prior musical experience. One student remarked "if elementary students were taught everything the elementary education majors were learning in the Basic Music class, it would turn the elementary students away from music altogether."
5. *Materials used in class were confusing and explanations unclear* - The students were asked if the materials used in the class were sufficient to help them understand the musical concepts. Two students reported the materials were adequate and understandable; however, of the 11 students who responded to this question, 6 reported the materials were confusing and the explanations unclear. It was noted that many of the students who felt the explanations were unclear reported having a graduate assistant as the instructor rather than a professor.
6. *Students felt music was important for elementary students, but didn't intend to teach it themselves* - When asked whether music was an important part of elementary students' education, 2 students reported they felt it was "somewhat important", 10 students chose "important", and 2 students selected "very important". Out of these 14 students, 5 felt music needed to be included in the elementary schools, but believed there would always be a music teacher/specialist employed.

7. *Not enough emphasis on why the Basic Music class is important* - The students were asked if the instructor explained the usefulness or importance of the class. Out of the 11 students who responded to this question, 8 reported no explanation was given, 2 students stated the given reason to be "we need it for Music for the Elementary Teachers class", and one student reported they were told "you will use some music in your class and some schools won't have a separate music teacher

8. *Need computer programs* - In response to the question of whether computer-based drill and practice programs would benefit the Basic Music class in general, 17 of the 18 respondents agreed computer programs would greatly enhance the class. In this regard, several of the more experienced students admitted they felt they would have done poorly in the class had they not had previous musical experience. These students reported computer-assisted drill and practice over the music concepts would have greatly helped most of the students in the class, especially those with little or no previous musical experience who seemed to need increased remedial drill. One student felt computer programs to be helpful and they should be a mandatory part of the Basic Music curriculum.

Recommendations

In response to the eight findings listed above, the following recommendations are made:

1. **Students unclear about the relevance of the class to their future plans;**
6. **Students felt music was important for elementary students, but didn't intend to teach it themselves.**
7. **Not enough emphasis on why the Basic Music class is needed**

The students stated the Basic Music class was irrelevant to their teacher training or "did not prepare them for what they plan to teach". Thus, they felt learning music fundamentals is an unneeded skill and something they would never teach. To remedy this situation, greater emphasis needs to be placed on making the class "worthwhile" to the students. According to Sullivan and Higgins (1983, p. 12), there are two questions teachers should ask themselves when measuring whether instructional objectives are "worthwhile" to the students:

(1) Is this a skill that the students will actually use in life?

(2) If not, is this skill required in order to acquire another useful skill?

A majority of the students polled reported they were not given a reason for why the Basic Music class is required or needed. For those students participating in the survey who were given an explanation, having to take Basic Music "in order to prepare for the second required course, Music for Elementary Teachers," was not an acceptable justification. Instead of this explanation, it might be more helpful for the students to be assisted in visualizing themselves in an elementary classroom setting where there is not a music specialist available. Possible scenarios and potential teaching situations where they may be required to include music in their classroom should be made plausible and real to them.

John Keller (1987) developed the ARCS Model of Instructional Design, a method for improving the motivational appeal of instructional materials. "The ARCS model defines four major conditions (Attention, Relevance, Confidence and Satisfaction) that have to be met for people to become and remain motivated" (p. 3). Under Relevance,

there are six subcategories. To ensure student motivation based on relevance, one or more of these strategies should be included in the instructional process. See Figure 1.

Figure 1:

Figure 1
Relevance Strategies

R1: Experience
- R1.1 State explicitly how the instruction builds on the learner's existing skills.
- R1.2 Use analogies familiar to the learner from past experience.
- R1.3 Find out what the learners' interests are and relate them to the instruction.

R2: Present Worth
- R2.1 State explicitly the present intrinsic value of learning the content, as distinct from its value as a link to future goals.

R3: Future Usefulness
- R3.1 State explicitly how the instruction relates to future activities of the learner.
- R3.2 Ask learners to relate the instruction to their own future goals (future wheel).

R4: Need Matching
- R4.1 To enhance achievement striving behavior, provide opportunities to achieve standards of excellence under conditions of moderate risk.
- R4.2 To make instructions responsive to the power motive, provide opportunities for responsibility, authority, and interpersonal influence.
- R4.3 To satisfy the need for affiliation, establish trust and provide opportunities for no-risk, cooperative interaction.

R5: Modeling
- R5.1 Bring in alumni of the course as enthusiastic guest lectures.
- R5.2 In a self-paced course, use those who finish first as deputy tutors.
- R5.3 Model enthusiasm for the subject taught.

R6: Choice
- R6.1 Provide meaningful alternative methods for accomplishing a goal.
- R6.2 Provide personal choices for organizing one's work.

2. Dissatisfaction with playing the recorder

On the opinion questionnaire, students also reported they did not understand why they have to learn to play the recorder. They believed this requirement to be a mundane task as well as "being an instrument they'll never again play." Justification of the use of the recorder as a performance medium should include:

- The recorder is a very inexpensive instrument ($10) which most parents can afford for their children (unlike expensive band instruments).

- The recorder teaches the basic fundamentals of playing other instruments and may give children the opportunity to play an instrument that is similar to the more expensive instruments but not out of financial reach.

- The recorder performance effectively demonstrates the elementary education majors' music reading ability (treble clef, single staff) which is a primary focus of MU-124 and a necessity in order for students to effectively incorporate music in the elementary classroom.

3. **Students with prior music study were bored;**

4. **Students with little or no previous music training were overwhelmed;**

5. **Materials used in class were confusing and explanations unclear;**

8. **Need computer programs;**

Based on student feedback, it would appear the addition of computer-assisted instruction may serve to increase student understanding of the musical concepts to be learned by allowing for multiple and varied explanations of those concepts. Computer-assisted instruction has the potential to provide for more individualization of instruction as well as provide for a variety of learning styles. When asked if they would benefit from using computer programs that "drilled" some of the musical concepts, an overwhelming percentage (99%) of the students responded positively.

In addition, one student felt using the computers should be required (not optional). In line with this idea, Bresler and Walker (1990) found "the integration of the computer with the formal curriculum as part of the requirements (rather than being an embellishment) is a necessity. In an academic environment, the great majority of students do what they are required to do" (p. 71). Hartig (1984) claimed students should be given the freedom to choose whether to use the computer programs or not. He went on to say that students should not be forced to use a medium with which they feel uncomfortable (as quoted in Bresler & Walker, 1990).

DEVELOPMENT OF THE CASE STUDY: CURRICULUM ASSESSMENT, TECHNOLOGY EVALUATION AND DEVELOPMENT

Process

The primary purpose of this case study is to assess whether the addition of technology into the MU-124: Basic Music course curriculum will affect the attitudes and motivation levels of elementary education majors' when learning the basic fundamentals of music. The first step in the process consisted of the previously discussed pilot questionnaire.

The development of the case study involved three steps. First, an instructional analysis of the existing curriculum was completed. This included a review of the course objectives and course outcomes, analysis of the curricular materials, and a survey of the method of instruction presently used. The second step consisted of a thorough review of existing technology and its specific applicability to the course outcomes. The third step was the compilation and development of class materials.

The specific purpose for each of aforementioned steps is presented below:

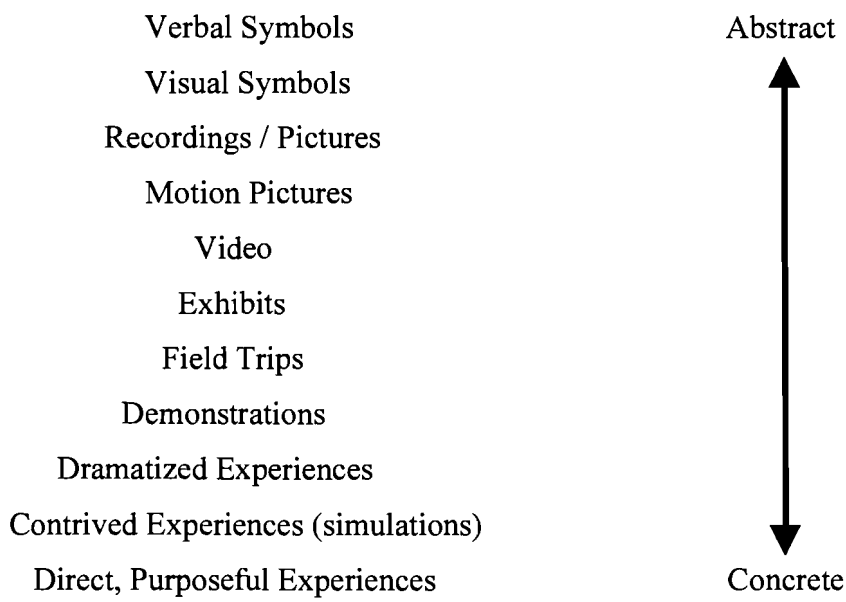
1. Instructional analysis of the existing curriculum

An instructional analysis of the existing curriculum was completed. This included a review of the course objectives and course outcomes, analysis of the existing curricular materials, and a familiarity with the presently used method of instruction. Although technology was to be added to the current curriculum, the actual curricular materials (i.e. written assignments, exams, and recorder performance exams) would remain the same. Care was taken to match the technology to be implemented with the existing course

objectives and instructional outcomes. Instructional technology materials (computer programs, web-based instruction, etc.) were chosen based on the ability to "drill" the topics and concepts specific to the course.

According to Sullivan & Higgins (1983), students need to be provided with the opportunity to "practice" the task stated in the instructional objective and then given appropriate feedback on that practice. "Appropriate practice is practice of the exact task stated in the objective" (p. 38). In virtually all of the previously reviewed research studies, the researchers found computer-assisted instruction to be particularly useful in providing practice and immediate feedback. Edgar Dale (1946) developed the "Cone of Experience" which supported the use of new media (computer technology) for instruction. According to Dale, educational experiences should be arranged so that the learner is taken from the most concrete to abstract. Many software programs can present dramatized events as well as contrived experiences in very creative and interactive ways, providing for concrete experiences. See Figure 2:

Figure 2: The "cone":



Jerome Bruner (1966), in developing his theory of instruction, described the "Concrete-Abstract Continuum" which also supports the use of "new media" (computer technology). Bruner's theory of instruction proposes that instruction should proceed from direct experiences to iconic representations of experience (such as pictures and video) to symbolic representation (such as words and numbers). In general, new media can approximate direct or contrived experiences easier than old media.

2. Thorough review of existing technology

After completing the instructional analysis, a thorough review of existing technology was accomplished. The purpose of the technology evaluation was to compile CAI programs specific to the course outcomes and objectives. The Windows operating system was chosen for use over the Macintosh platform primarily due to availability. The facilities available to the researcher utilize the Windows 95 operating system. The computer lab houses 18 Pentium, 133 mhz, multimedia computers with super VGA monitors. These units were placed against three walls with large tables in the center of the room. When seated at the computers, the students faced the walls and had to turn their bodies variously to view the teacher at the front of the classroom. At the head of the class, a teacher's station included a computer connected to an In-Focus, high resolution, video projection unit that would project the computer monitor onto a large screen.

3. Compilation and development of class materials

The general purpose for compiling and developing class materials was to provide an organized set of curricular materials for implementation into the Basic Music curriculum. The specific goal was to take the most educationally relevant, commercially

available computer programs and compile them with self-authored computer-assisted instruction and web-based materials.

Procedure

The instructional analysis of Basic Music curriculum was completed during the fall semester of 1997. Class materials (written assignments, mid-term & final tests, recorder playing exams, etc.) were reviewed and the specifics of the instructional objectives noted.

Following the analysis, an extensive search for pre-existing, Windows-based, music software was undertaken which included in-depth Internet searches, electronic communication with various publishing companies, and electronic discussion with music-specific Listservs and discussion groups. Interviews were conducted, both in person and electronically, with established music theory instructors as to their knowledge of available software for teaching the fundamentals of music.

Three programs were selected:

(1) *Mibac Music Lessons* was chosen primarily for its availability. Although it is already owned by the Division of Music, the version used is for Macintosh. The company was contacted via the Internet site and a complimentary Windows' version was requested. Permission was granted to evaluate and use the program for research (see appendix D). Three modules are relevant to the Basic Music class: Circle of Fifths, Key Signature Drill, and Note Durations. The Note Durations module utilized fractions to describe the note duration instead of equivalencies (e.g. 2 eighth notes equal 1 quarter note), as is taught in MU-124.

Therefore, this module will be provided as a supplement to the recommended Module 2 in the Foundations of Music program.

(2) *Foundations of Music: A Computer-Assisted Introduction*, by Robert Nelson & Carl Christensen, 1997, Wadsworth Publishing Co. ISBN 0-534-50740-9, was chosen because most of the drill modules in the program are presented in the same format as the existing Basic Music objectives. Thus, it drills the students on the same tasks they are being asked to complete on the written exams/assignments. The modules to be used are as follows:

- Module 2 (Note Values, Note Values, Rests, Pitch Naming, Pitch Writing, Keyboard)
- Module 3 (Inserting Barlines, Completing Measures - Simple meters)
- Module 4 (Whole & Half Steps on the Keyboard, Whole & Half Step Recognition & Spelling, Enharmonics, Major Scale Writing & Spelling & Recognition, Major Key Signature Spelling & Recognition)
- Module 5 (Inserting Barlines & Completing Barlines - Compound meters)
- Module 6 (Minor Scale Writing & Spelling & Recognition, Minor Key Signature Spelling & Recognition, Key Signature Recognition - Major & Minor)
- Module 9 (Interval Writing & Spelling & Recognition)
- Module 10 (Triad Writing & Spelling & Recognition)
- Module 12 (Musical Terms)

Permission to use this program for research was granted by the Editor at Wadsworth Publishing. This program fits on one floppy disk that comes with a textbook

(3) *Recorder Teacher* was chosen after it was discovered through an Internet search. This program is appropriate for all age levels and is being used to assist the elementary education majors in learning to play the recorder through fingering drills, staff notation drills and play-along features. The students will be encouraged to try all the features of the program; however, they will be specifically directed to use the

fingering drill module and the note testing module. Through electronic communication with the author of the program, a life-long site license for 40 computers was granted and purchased by the Division of Music. Furthermore, the author has granted permission to give each elementary education major an individual demo copy of the program. In addition, the author is contemplating a discount price for these student teachers should they wish to register the demo copy, thus converting it to a full working copy. The program was downloaded from the author's Internet site at: http://ourworld.compuserve.com/homepages/john_child/

The development of other class materials was also undertaken during the fall 1997 semester in order to provide supplemental instructional information not found in the commercially available software programs to be implemented. Due to the availability of the Internet, ease of access across computer platforms, and its general usefulness as a vehicle for the delivery of instruction and student-teacher communication, a class web page was developed. The class web page (see appendix E) is located at *http://www.emporia.edu/www/idt/musform/basicmus.htm* and includes:

(1) Information about each of the computer programs to be used.

(2) Links to e-mail the instructors.

(3) Helpful music sites (i.e. the Mibac Company site which includes a tutorial detailing many of the musical concepts to be learned in the Basic Music class.

(4) An assignment page giving specific computer program modules to use with each assignment.

(5) Reviews for the mid-term and final exams to include practice modules and terminology links.

(6) Other supplemental information to include memory aids and rules to remember when learning certain musical concepts.

An additional self-authored computer module was created for integration into the curriculum. The researcher identified the absence of a module that drills the key names on the keyboard in the existing software chosen for use in the Basic Music class. The computer programs drilled note names, but only as they appear on the music staff. Thus, a module was created using Multimedia Toolbook for Windows which randomly generates a note name ($C^{\#}$, D, E^{b}, etc.) which the student must identify on the keyboard by clicking on the appropriate piano key. Students are then given immediate positive or negative feedback. There is an unlimited number of random generations of this exercise that may occur. See Appendix F for visual interface of this module. See Appendix G for information on all the computer programs reviewed for this study.

Summary

In summary, a preliminary pilot study was conducted using Internet-based questionnaires and electronic mail. The results revealed negative student attitudes toward the traditional Basic Music class and showed the students to be favorably in support of adding computer-assisted instructional materials to the Basic Music curriculum. In conjunction with this attitude assessment, an instructional analysis of the existing curriculum was completed. The next step consisted of a thorough review of existing CAI programs with emphasis on specific applicability to the Basic Music course outcomes. The final step in preparing for this portion of the research was the selection, compilation and development of the new course materials.

CHAPTER IV

CASE STUDY

Subjects

Two of the four sections of the MU-124: Basic Music class, offered in the Spring 1998 semester, were selected for the case study. The two sections chosen were taught by graduate teaching assistants (GAs) – one male and one female, respectively – each with opposite teaching styles and personality types. The researcher chose to work with these graduate assistants for several reasons. First, working with these GAs allowed for the variety of gender, personality, and teaching styles mentioned above. In addition, each GA had already completed a semester of teaching Basic Music using primarily paper-based, non-computerized materials. Thus, it was hoped that a more detailed comparison of the two approaches could be gleaned from having the GAs compare the delivery methods of each semester's experience. Each section had 19 students enrolled (N=38).

Section A was taught by a rather animated, out-spoken female whose voice was easily heard above class noise. The class was primarily made up of elementary education majors fulfilling a degree requirement (N=17) with the two remaining students taking the class completely as an elective. Out of the 19 students enrolled in section A, only three were male (approximately 15%). The class was made up of 10 freshman, 3 sophomores, 5 juniors, and 1 senior.

Section B was taught by a male GA whose personality was more reserved and soft-spoken. He had a rather flat affect and sometimes had trouble being heard over class noise. This section consisted of 16 elementary education majors fulfilling a degree requirement, 2 recreation majors fulfilling a degree requirement, and 1 student taking the

class as an elective. There were 12 freshman, 5 sophomores, 1 junior and 1 senior. There were 15 females and 4 males.

Setting

The case study was conducted during the 1998 spring semester at Emporia State University, a medium-sized, mid-western university. This is the same setting (university and computer laboratory) used in the pilot study, previously discussed in chapter 3. The two sections of the Basic Music class were exclusively taught in a Windows-based, educational computing laboratory located in The Teacher's College.

Classroom equipment included a high resolution, In-Focus 520, projection unit attached to a teacher's station setup at the head of the room. This allowed for easy in-class demonstrations of the computer programs to be implemented. An overhead projector was also available for transparencies. No piano was present. This lab housed 18 Pentium, Windows 95, multimedia, networked computers, each on its own computer station desk which lined the three walls other than the head of the room.

Room arrangement consisted of computer workstations arranged on three outside walls of the room perimeter. Workstations were placed with the student facing the outer wall, allowing for greater ease of observation by the researcher. In the center of the room, there were large tables where the students could sit during lecture portions of the class.

There was an adjoining computer room with 5 other computer stations capable of running the music programs. This was made available so that each of the students enrolled in Basic Music would have the opportunity to have his/her own individual workstation for the computer drill portion of the class. It is interesting to note that none

of the students went into the adjoining room but rather, several students randomly paired at a computer for cooperative drilling.

Prior to the first day of class, the following computer programs were installed on the local server in the IDT computer lab. The researcher then created an icon group on the Windows' desktop, labeled "Basic Music Programs". Inside this icon group, icons were created for each of the three computer programs to be used (*Foundations of Music, Mibac Music Lessons, and Recorder Teacher*), another for the CAI program authored by the researcher (*Music Madness*), and another icon created as a shortcut to the class web page. This was accomplished prior to the start of the spring semester in order to ensure a smooth transition of the technology integration. The lab assistants made sure the computers were powered on prior to the start of each class, therefore the graduate assistants teaching the Basic Music class were not burdened with that responsibility.

PROCEDURE

Data Collection

Data collection for the case study included interviews, observation and student questionnaires. The two graduate teaching assistants were interviewed by the researcher at the beginning and the end of the semester. In addition, the researcher intermittently received oral feedback throughout the semester from the teaching assistants as well as from some of the students involved. Section A met a total of 27 class periods. The researcher was present for 18 of these sessions, one of which the GA was absent and the researcher taught the class. Section B met a total of 27 class periods with the researcher being present for 19 class sessions.

A written questionnaire was distributed out on the last day of class (prior to the final examination) and class time was utilized in order to ensure data collection from all students involved. See Appendix F for questionnaire. Students were reminded that the questionnaires were anonymous and were invited to speak to the researcher in a personal interview on a voluntary basis. Several students met with the researcher after class.

Description

This research project might best be described as a "curricular change in action". There was no preliminary preparation of the graduate assistants prior to the beginning of the semester, other than being informed they would take part in this research. Neither GA reviewed the computer programs prior to the beginning of the semester. Because of this, the role of the researcher during class was more of an active participant rather than a silent observer.

Prior to the beginning of each class session, the GA and researcher would consult with each other regarding the class content for that day. The GA determined the session content based upon the established course syllabus. The researcher provided appropriate computer program modules for drilling those particular concepts.

Short tutorials were given, by the researcher, on each computer program prior to student use. The researcher was present during most of the class periods, demonstrated the programs, and actively answered all questions concerning the technology components. In addition, the researcher provided individual support to the students during class and was available outside of class to give individual attention to any of the students that worked on the computer programs.

A typical class session included a lecture or discussion portion followed by a period of in-class drill over the musical concepts described in the lecture. The in-class drill exercises were conducted both in the traditional "on-the-board" group drill format and by utilizing individual, computerized drill with each student working through the modules at his/her own computer workstation. This allowed the students to pace themselves accordingly. Some class sessions consisted entirely of lecture, while others utilized the entire class period for group recorder playing.

The specific concepts covered in each class session along with the computer modules suggested for use with each concept can be seen in Figure 3.

Figure 3:

Class Session	Concepts Presented	Modules Utilized
1	Properties of Sound: Lecture on various aspects of melody, rhythm, harmony, form, dynamics, tempo, timbre, texture.	No computer modules suggested. Researcher gave 15 minute introduction to computer programs; explained justification for using the recorder and for the Basic Music requirement.
2	Lecture: Introduction to the elements of musical notation – staff, clef signs, key signatures, meters, notes, and bar-lines.	*MiBac Music Lessons* - module 12 (terms) Class Web Page
3	Lecture: Notation & simple meters - Quantitative aspect of music by focusing on duration, notes/note-duration, meter/accent, meter signatures, and bar-lines as preparation for counting simple meters.	*MiBac Music Lessons* - module 9 *Fundamentals of Music* - modules 2 and 3 *Recorder Teacher* modules recommended and students informed a demo version of the software was available for each student.
4	Exercises in identifying various meters and counting different rhythmic patterns.	*MiBac Music Lessons* - module 9 *Fundamentals of Music* - modules 2 and 3
5	Continuation of class session 5	Same as above

Class Session	Concepts Presented	Modules Utilized
6	Lecture: Pitch Notation - discussed concepts of pitch, pitch notation, and pitch identification by use of letter names.	*Fundamentals of Music* - modules 2
7	Lecture: Pitch notation by use of octave designation. Learn system of octave identification. Introduction of piano keyboard. Exercises: pitch notation emphasizing correct octave identification.	*MiBac Music Lessons* - module 1 *Fundamentals of Music* - module 2 *Music Madness* - keyboard drill Class Web Page
8	Lecture: Intervals - Define interval and identify by number and quality. Identify major and minor 2nds/3rds	*Fundamentals of Music* - modules 4 and 9
9	Continuation of class session 9	Same as above
10	Lecture: Major Scales and Key Signatures - use piano keyboard to learn major scale pattern. Write various major scales on staff. Label scale degrees by number, letter and syllable identification. Introduce major key signatures.	*MiBac Music Lessons* - module 4 *Fundamentals of Music* - modules 4
11	Exercises: Write major scales and determine major keys by use of key signatures.	*MiBac Music Lessons* - module 3 *Fundamentals of Music* - modules 4
12	Comprehensive midterm exam review	All previously mentioned modules. A comprehensive review was created on the Class Web Page. No drill aspect to the web page - entirely informational.
13	Midterm exam	
14	Review recorder fingering emphasizing correct fingerings for g-a-b-c-d	*Recorder Teacher* - Finger Chart module and Read A Note module specifically, but all recommended.
15	Midterm recorder playing exam	
16	Review notation and simple meters with emphasis on counting various 16^{th} note rhythmic patterns.	*MiBac Music Lessons* - module 9 *Fundamentals of Music* - modules 2 and 3
17	Lecture: Triads and 7^{th} Chords - define, identify, build major/minor triads 7 maj-min 7^{th} chords. Identify, build triads, chords in root position & inversions.	*Fundamentals of Music* - module 10 Class Web Page

Class Session	Concepts Presented	Modules Utilized
18	Continuation of class session 19.	Same as above.
19	Lecture: Compound and Shifting Meters - identify meter/beat in compound meters and counting compound meters.	*Fundamentals of Music* - module 5
20	Exercises on counting compound meters and in identifying/building major/minor and major-minor seventh chords.	*Fundamentals of Music* - module 5 and 10
21	Lecture: Minor Scales and Key Signatures - Learn pattern for minor scales. Label scale degrees by number, letter and syllable identification. Determine minor key through use of key signatures. Discuss concept of relative major/minor. Exercises: Writing natural minor scales and identifying major/minor scales by using key signatures.	*MiBac Music Lessons* - module 3 and 4 *Fundamentals of Music* - module 6 Class Web Page
22	Continuation of class session 24	Same as above.
23	Review major/minor triads and major-minor seventh chords. Introduce, define, identify and build augmented/diminished triads.	*Fundamentals of Music* - module 10
24	Exercises: Identify/build major/minor, augmented/diminished triads and major-minor seventh chords. Review recorder fingerings in preparation for final individual recorder playing exam.	*Recorder Teacher* - Finger Chart module and Read A Note module specifically, but all modules are helpful
25	Final recorder playing exam	
26	Lecture: Introduce, define, discuss and illustrate the concept of transposition. Exercises: Transpose simple melodies from one major key into alternate major keys.	No computer modules used included drill on transposition.
27	Review for final written exam	

In addition to learning the music concepts listed above, the students were required to play the recorder as part of the Basic Music curricular requirements. The students were allowed class time variously throughout the semester in the form of group playing. The *Recorder Teacher* computer program was introduced at the beginning of the

semester. Thereafter, the students were reminded to make use of the drill and practice software to learn and reinforce the recorder fingerings. The GA teaching section B of the Basic Music class occasionally opted to have the students use *Recorder Teacher* during class in place of the group recorder playing. The students also had the opportunity to request their own demo copy of the *Recorder Teacher* program for use outside of class.

CHAPTER V

RESULTS, CONCLUSIONS AND RECOMMENDATIONS

RESULTS

Observations

The Computer as an Instructional Tool

Use of the computer programs not only bridged gaps in the musical skill levels of the students, but also seemed to bridge the differences in personality and teaching styles of the two GAs. The GA teaching section B of the Basic Music class occasionally opted to have the students use *Recorder Teacher* during class in place of the group recorder playing. This approach was more effective for this GA due to his soft-spoken demeanor, whereas the GA teaching section A preferred group playing. Section B's GA also utilized the computers for drilling concepts more frequently than the more aggressive GA of Section A, who oftentimes drilled the students verbally.

Regarding the use of the Recorder Teacher program, the GA in Section A noted the program to be more useful at the beginning of the semester when the students were learning fingerings. After that, very few of the students voluntarily used the program. However, when polled, 16 out of 19 students in each section stated they would use the program in their own classrooms if asked to teach music.

An observation which reinforced the value of using the computers to drill the students occurred during the eighth class session. The GA of Section A chose to go around the class and drill each student on constructing major and minor thirds. The GA of Section B opted to have the students drill at the computers for the entire class session. The students in Section A each got only one chance at identifying an interval whereas the

students in Section B got multiple chances to drill. The GA in section A admitted that the individual drill was time consuming, but in light of the computer programs' inability to record student progress, she felt the need to be sure each student could properly identify the intervals. Although the students in section B were able to drill more, the GA had to trust the students to actually do the drilling and hope they were answering correctly.

Several of the students expressed frustration with the amount of material covered in the course of the semester. Those who voiced the frustration reported the computer programs eased some of their discontent. A few students viewed the addition of the computer drills to be unwanted additional requirements in a class they felt was already over-taxing.

Preparation of the Graduate Assistants

One of the major drawbacks of this case study was the lack of preparation of the GAs by the researcher prior to the semester. The GAs were not introduced to the computer programs before the implementation process, thus the "order" of the information presentation was not always synchronized with the computer drill prior to the start of each class period. The GAs and the researcher had to confer before and during the computerized drill time in order to ensure the proper combination of drill modules and lecture.

Student Interaction and Attitudes

Both the researcher and the graduate assistants noted an overall positive increase in student attitudes as a result of using the computer programs. It was noted that once the students were drilling on the computers, it was difficult to get them to stop drilling and

return to the tables for lecture. Students seemed less frustrated with computer problems than expected which correlates with the number of students having prior computer skills.

Students appeared motivated and more attentive to drilling concepts when using the computers. The computerized drill allowed individuals to go at their own pace. The students with little or no prior musical experience were able to move progressively through the easier modules into the intermediate levels. Students with an increased level of prior musical experience tended to get bored. Many of these students moved on to harder levels out of curiosity.

The researcher observed one instance of "paired learning" which appeared to be effective. While involved in computerized drill, one student appeared not to be interested in participating in the drills. Another student, who was sitting close by, was visibly having trouble grasping a certain musical concept. It was obvious the troubled student was confused to the point of giving up. The seemingly apathetic student suddenly and voluntarily moved over and began helping the troubled student. After ten to fifteen minutes, the experience proved positive for both students. The troubled student was able to grasp the concept and the student, who previously appeared apathetic, reinforced her own knowledge of the subject matter as well as gained practice in tutoring. This peer tutoring process seemed to be easier on the troubled student as well as keeping the above-average student motivated and active.

Both GAs had previously taught the Basic Music class without the use of computer-assisted drill. They were asked to compare that semester's experience with this semester's revamped curriculum. The GA of section A reported students came into her office constantly during the first semester seeking extensive help with the music concepts

presented in class. With the addition of the computer-assisted drill, she noted students were able to more efficiently keep up with the concepts. She stated the students seemed to enjoy using the computers for drill and seemed to respond positively to the step-by-step progressive nature of the computer programs.

One final note on student attitudes toward the addition of the computer programs for drilling musical concepts should be noted. Students in the other non-computerized sections of the Basic Music class voiced complaints and inquiries as to why they weren't allowed to use the computers in their sections. This would seem to indicate that students expect technology components to be integral to the curriculum.

Use of the Computer Lab

The computer lab setting for this class was considered adequate with one exception. It would have been helpful to have a keyboard in the room. Although ear training was not a part of this class, the ability to demonstrate major and minor scales, chords, and intervals may have enhanced the students' understanding of the concepts. The computer modules allowed for identification of these musical concepts; however, having a keyboard present would have allowed the GA to demonstrate during the lecture portion of class. Instead, the students had to wait until drill time at the computers was allotted before hearing examples of the lecture concepts.

Initially, there was concern regarding individual versus group recorder playing in the computer lab setting. When drilling individually, using *Recorder Teacher*, the students each faced their own computer and played at their own pace. This created slight cacophony in the classroom. When the students were polled as to whether all the random playing bothered them personally or interfered with their own practicing with the

computers, the majority of the students preferred playing along with the computers over group playing in class. One student articulated an advantage of playing along with the computer, namely being able to view both the fingering chart and the notes on the staff as they were playing. Most students preferred to use *Recorder Teacher* in order to go at their own pace.

Questionnaire

The questionnaire was given to each student on the day of the final exam. The questionnaire included questions which required a yes or no answer as well as questions that were open-ended. See Figure 4 on the next page for a breakdown of the yes/no question results.

Figure 4

YES/NO Questions	Section A			Section B		
	YES	NO	No Ans	YES	NO	No Ans
Elementary Education Major	17	2		16	3	
Nervous about taking the class	9	10		5	14	
Was the class too difficult?	8	11		8	11	
Did you know about the "test out" option?	17	2		15	4	
Did you ever use the computer programs outside of class?	4	15		5	14	
Did you ask for your own copy of the programs?	2	15	2	3	14	2
Did you explore extra modules in the computer programs (those not suggested in class)?	6	13		2	17	
Was the reason for learning to play the recorder explained thoroughly enough at the start of class?	11	7	1	11	8	
Did the computer programs help you?	13	5	1	14	2	3
Was the reason for having to take this class explained well enough at the beginning of the semester?	14	5		11	8	
Did you access the web page?	8	9	2	8	11	
Would you use *Recorder Teacher* in your elementary classroom?	16	2	1	16	3	
Did you access the HELP (tutorial) information in *Mibac Music Lessons*?	6	13		7	12	
Did you enjoy using the computers?	15	4		17	2	
If given a choice, would you choose to take this class with the computers (vs. without)?	17	2		17	2	
Did you learn something new in this class?	16	3		18	0	1
Have you used computers much in the past?	16	3		15	4	
Did your computer skills improve as a result of this class?	3	16		8	11	

Summary of Student Comments

The following section includes student feedback for specific questions. There were 28 students polled.

1. *Were you nervous about taking the class?* Fourteen students expressed nervousness about taking Basic Music. The major reason offered involved the students having

little or no musical background. Several students reported anxiety at having to play the recorder. One student attributed his nervousness to "music not being fun".

2. *Did you think the class was too difficult? Why?* Sixteen students felt the class was too difficult, primarily due to the amount of material covered in class. Some students suggested the course material should be more "basic" (e.g. eliminating the augmented and diminished triad section). Several students felt the materials were presented too quickly, although they added they didn't feel it was the fault of the teachers. This correlates with student opinions that the class has more course content than can be absorbed in one semester.
3. *How do you feel about music in general? Do you think music is an important part of elementary education?* Three students reported that music is very important in elementary education because it provides a well-rounded education. One student felt music was very important because "it uses both sides of the brain." Twenty-three students felt music was important in elementary education but did not offer explanation. Three students felt music was important but believed a music teacher should or would be teaching it. One student felt music enhanced a child's mode of expression. Another student stated music should be taught because "it's a lot of fun." It was also suggested by one student that music should be taught in elementary schools with more of a music appreciation approach without "all the sharps and flats." Three students felt music was not important to them, stating "there are music teachers for that and I won't be teaching music."
4. *What did you "hear" about this class prior to taking it?* Most students reported they had not heard anything positive or negative about the class prior to taking it. Five

students heard that it was a difficult class. Two students heard it was a "waste of time." One student heard it was easy. One heard it was boring whereas another heard it was interesting. The fact that only four students had heard negative things about the course was a surprise finding. The findings of the pilot attitudinal survey, as discussed in Chapter 3, reflected a high level of student displeasure with the course. Because of this, the researcher had assumed most of the students enrolled in this semester's course would enter the class with a negative attitude.

5. *How did you feel about having the class in Visser Computer lab?* Thirty-six students liked having the class held in Visser. Two reasons were given: (1) "The lab was closer to my other classes," and (2) "It was nice to have the computers." The two students not liking the location reported they didn't like playing the recorders in the lab and felt they should have been in a music room.
6. *Did the computer programs help you?* Three students did not feel the computer programs helped them at all. One student felt they were helpful, but not challenging enough. This student, however, had extensive prior music experience. The other 34 students felt the computer programs greatly enhanced their learning. The most reported reason was the opportunity to have repeated drill and practice with immediate feedback. Some students felt they were better able to comprehend the concepts by using the programs to review the lecture topics. The computer programs were reported to provide variety without monotony. One student specifically mentioned *Recorder Teacher* as being particularly helpful with learning recorder fingerings. Several students liked working at their own pace and reported the computers "made it fun to practice what we had learned." One student expressed

relief with the statement, "I knew that if I wanted to practice, all I had to do was hop on a computer, even if I couldn't get in touch with the teacher."

7. *Did you feel that using the programs made the class more "fun" for you? Added variety? Or just added more work for you?* Thirty-five students felt the addition of the computers added variety, made the class more interesting, and provided a learning tool that was fun and useful. One student, who was repeating the Basic Music course, stated the computers made the class better in general. Four students felt the computers just added more for them to have to do.
8. *Did you enjoy using the computers?* Six students did not enjoy using the computers. Three of these students, although expressing displeasure with the computers, admitted that if they were given a choice, they would take the computerized section instead of the non-computerized section. The remaining 22 students expressed enjoyment for many of the reasons listed in number 7 above.

Adequacy of the Computer Programs

Of the three computer programs used, *Fundamentals of Music* was reported by the students to be the most helpful. The only visible flaw in this program is the user interface. Being a DOS (Disk Operating System) based program, as opposed to Macintosh or Windows, the interface was rather primitive and sometimes caused problems. If the student's mouse pointer was not in the exact needed location on the screen, the program wouldn't work and the student assumed they hadn't answered the drill correctly. This caused a fair amount of student frustration, especially with those students that had limited computer skills.

The other two programs, *Mibac Music Lessons* and *Recorder Teacher*, were Windows-based, but were not as all-inclusive as the *Fundamentals of Music* program with regard to concepts drilled. Only one of the programs, *Mibac Music Lessons*, has a record-keeping component that allows the students to record and view their progress. In addition, the programs did not include a testing module where the drills completed would be graded and recorded. These programs contained drill and practice modules only.

Conclusions and Recommendations

1. *Changing the curriculum.* The addition of the computer programs increased the motivation and positive attitudes of the students toward the Basic Music class. Therefore, it is the recommendation of the researcher to revise the Basic Music curriculum to facilitate the integration of computer technology. A program that will drill the basic music theory concepts is highly recommended. A program that drills recorder fingerings, such as *Recorder Teacher*, would be helpful but not as essential as the basic theory program. The Internet homepages designed for this course were static, non-interactive pages which presented content for review. An on-line, interactive quiz component would be helpful as it would provide student access to drill from any Internet-accessible computer. Web-based course tools such as Web CT, Web Course in a Box, among others have quizzing components built in and could easily be used to create an on-line drill and practice module.
2. *Course Modification.* According to Sullivan & Higgins (1983, p. 54-55), an essential part of effective instruction is assessment. Regarding assessment, they offer the following advice:

> The assessment items you write for your instructional objectives are used to determine whether students have acquired the skills and attitudes reflected in the objectives. These items, then, must assess the exact performances called for in the objectives. The conditions, or givens, in an objective must also be included in the assessment. The relationship between the objective and the assessment items is an important concern.
>
> Whether the desired relationship exists can be determined by asking two questions: (1) *Does the assessment item require the same performance of the student as that specified in the instructional objective? (2) Does the assessment item provide the same conditions or givens as those specified in the instructional objective?*

The curricular materials were not modified in order to compensate for the technology integration. The manner of assessment remained paper-based; therefore, the conditions for the "practice" over the concepts to be mastered didn't match those of the actual assessment. The students used the computer modules to drill and practice the concepts, therefore assessment should have likewise been accomplished using the computers. If the computer programs are to be used for in-class drill, the instructional objectives and assessment procedures must be changed to accommodate the computer-based setting. This would eliminate paper-based exams.

3. *Limitations of Computer Programs.* The computer modules need to have record-keeping capability as well as a tracked, graded testing section. Again, this would

replace the paper-based exams. Therefore, the conditions of the practice over the concepts to be learned and the conditions for the assessment will match.

Due to the limited number of Windows'-based music programs with the above-noted capabilities, Macintosh programs should be assessed. There are several Macintosh music software programs that have the needed capabilities. Many of these programs have demos and can be downloaded from http://www.musicstudy.com. One program in particular is *Practica Musica 3* by Ars-Nova, Inc.

4. *Preparation for this case study.* There was inadequate preparation and training of the graduate assistants prior to the beginning of the semester. A repeat study should include detailed preliminary training of the GAs on the computer programs and a correlation of each lecture concept to the appropriate drill modules. This would allow the researcher to have a less active role, thus becoming more of a silent observer. Preparation of the GAs should include at least a two to three hour, hands-on computer tutorial. Generally, most computer programs have extensive help files and oftentimes, a full interactive tutorial. That may be a consideration when choosing the computer software to be used.
5. *Repeating this study.* This study attempted to assess student attitudes in a qualitative manner. Future studies may be better served using a quantitative method. Using a Likert type scale when assessing student attitudes might yield more specific results. Future studies should also attempt to assess improvement in student grades as a result of computer integration.

It would also be interesting to assess whether gender influenced attitude toward using the computer. Because of the limited male presence in this study's sample, the

researcher was unable to make a correlation. All four male participants had positive attitudes toward the computers. Six out of the 24 females did not enjoy using the computers. Out of those six, two were non-traditional students.

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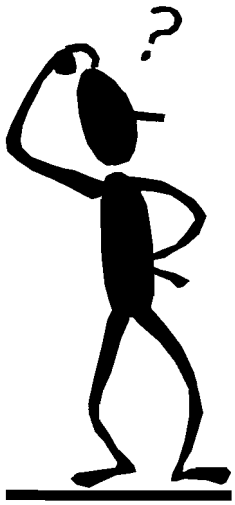
Appendix A

Explanation Document

For On-Line Questionnaire



Elementary Education Majors.....Help!!

My name is Lorena Smith. I'm the graduate assistant that works in the Windows-based computer lab (room 124-125) in Visser Hall. If you are an elementary education major or have taken the Basic Music class (MU 124), please take a moment to read this.

I am working on a research thesis and I need your help...(please). I am trying to establish the prevailing opinions or attitudes of the elementary education majors here at ESU concerning the Basic Music class (MU 124) that is a required course for the elementary education degree.

In an attempt to gather as much information as possible, I have created two questionnaires that I have posted on the Internet, one for those of you who have NOT yet taken Basic Music and another questionnaire for those of you who have already completed that course. I am hoping to get enough feedback from all of you regarding what you like/dislike about the course or what you would change about the course so that possible changes in the class curriculum can be proposed. The goal is to have a music class that better meets your needs.

Please be HONEST with your comments on these questionnaires. These questionnaires do not ask for your names and the information is strictly confidential. I simply need enough people agreeing or disagreeing about the class to make honest statements about the class in my research thesis.

The Internet address for the questionnaire for those who have NOT taken the class yet is as follows:

http://www.emporia.edu/www/idt/musform/pre.html

The Internet address for the questionnaire for those who have already taken the class is as follows:

http://www.emporia.edu/www/idt/musform/post.html

Thank you SO MUCH for helping me out with this. If there is anything I can do for you in return for your time, please feel free to come by the lab (room 125) and see me, call me at the lab (341-5586) or e-mail me at:

smithlor@esuvm.emporia.edu

If you would prefer to fill out a written version of the questionnaire instead of the Internet version, let me know and I would be happy to oblige.

Sincerely,
Lorena Smith

Appendix B

On-Line Questionnaire

I need your HELP!

My name is Lorena Smith. I'm a graduate assistant and work in Visser Hall PC lab (Rm. 124-125). Some of you have probably seen me there...some of you may not have met me yet. I'm working on two master's degrees, one in Music Education and one in Instructional Design & Technology. My goal is to try to establish the common attitude of elementary education majors toward the required Basic Music class. I will report my findings to the music department, so if you have any helpful suggestions, please comment. Thanks for the help!

Opinion Questionnaire

Complete this page if you have NOT taken Basic Music yet

There are two required music classes for elementary education majors – Basic Music, which must be completed first, then Music in the Elementary Classroom. This questionnaire is to evaluate how you feel about the Basic Music class.

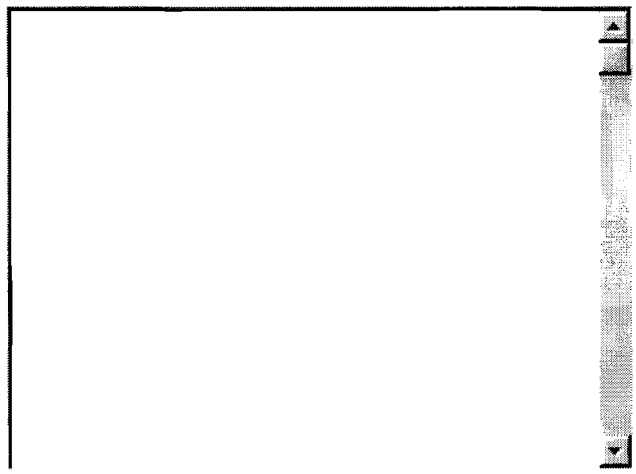
Answer the following: Please be honest. This is anonymous and is completely confidential.

Demographic Information:

1. **What grade level are you?** Junior
2. **What is today's date?**

1. **What prior music have you had (piano lessons, sing in church choirs, play an instrument in band, etc.)?**

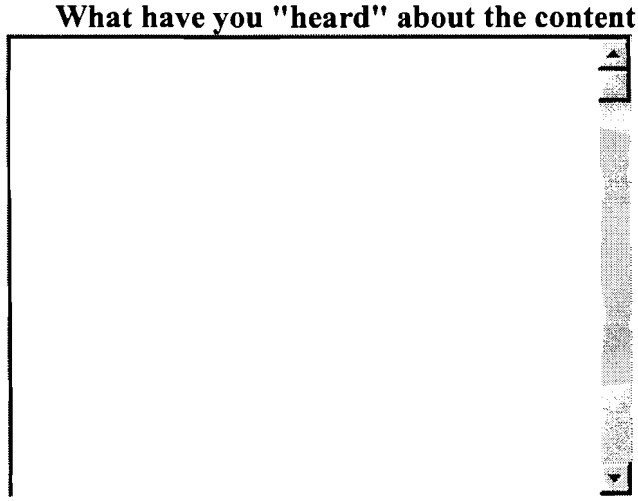
2. **What are you future plans? What teaching situation do you see yourself in?**



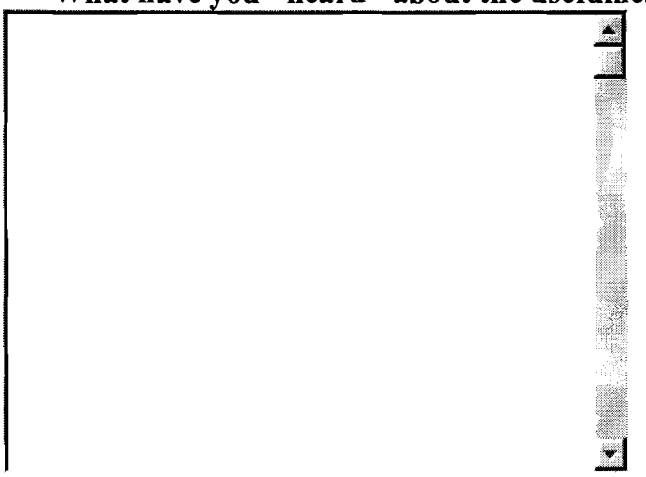
What have you "heard"?

1. **What have you "heard" about the difficulty of the class?**

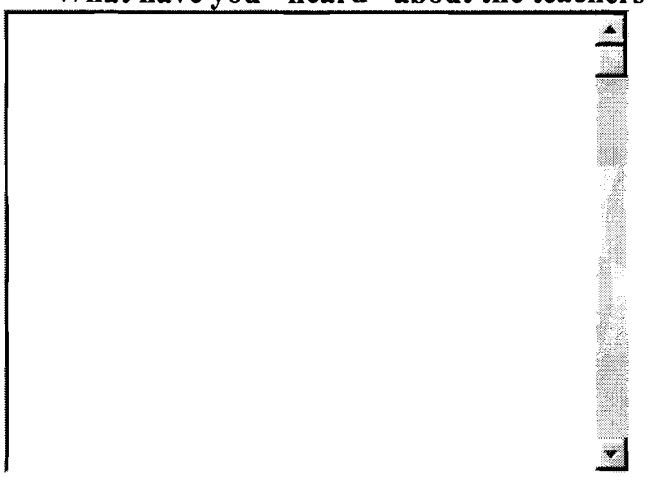
2. **What have you "heard" about the content of the class?**



3. **What have you "heard" about the usefulness of the class?**

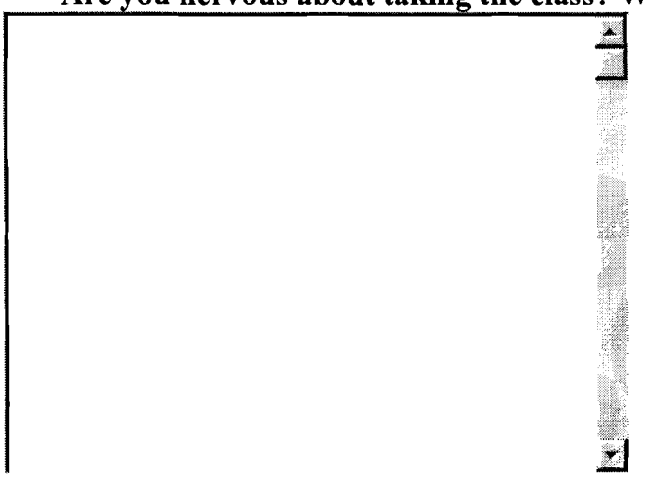


4. **What have you "heard" about the teachers of the class?**

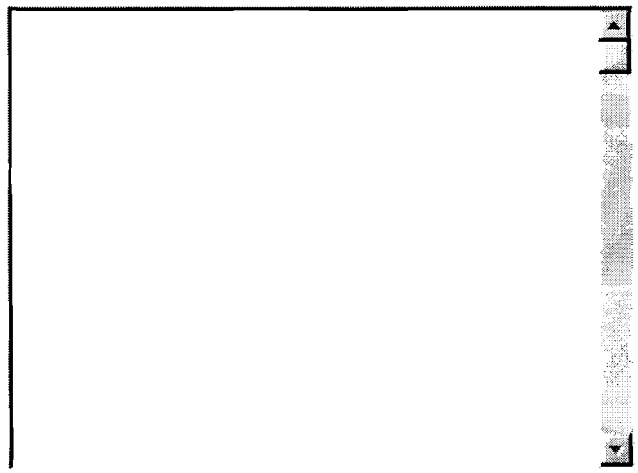


How do you feel?

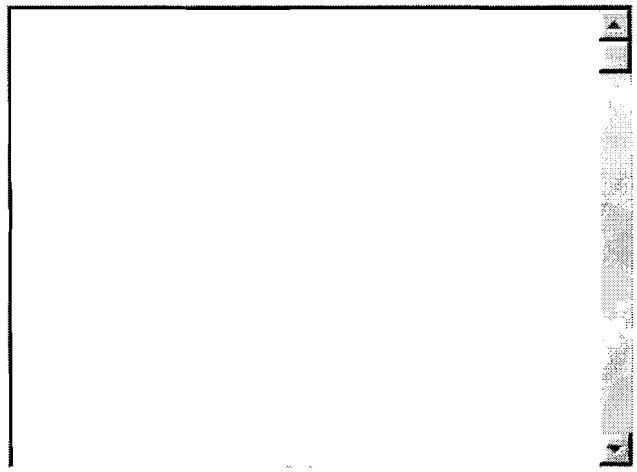
1. **Are you nervous about taking the class? Why?**



2. **How do you feel about music in general. Do you think music is an important part of elementary education?**



Please give any other comments you'd like here:



submit **Feel free to e-mail me: Lorena Smith**

Appendix C

On-Line Questionnaire

Detailed Breakdown of Results

Questionnaire Results Breakdown

What grade level are you?

Seniors – 5
Juniors – 5
Sophomores – 6
Freshman - 1

What prior music have you had (piano lessons, sing in church choirs, play an instrument in band, etc.)?

No experience – 4

One ensemble:	Band – 2
	Choir - 1
	Piano – 1
Two ensembles:	Band and choir – 6
	Piano and band – 1
Three ensembles:	Combination of band, orchestra, piano & choir – 3

Learned Recorder in Elementary School - 2

What are you future plans? What teaching situation do you see yourself in?

Undecided or non-specific - 1
Preschool – 1
Kindergarten – 2
Grade 1-3 – 4
Grade 1-9 – 1
Middle School (grade 4, 5) or higher - 4
ESL – 1
Special education – 3

What do you think about the difficulty of the class?

Easy – 7
Easy and boring – 2 (one had tested out but took it anyway)
Easy class material but recorders were hard - 1
Easy for me but seemed difficult for people with no prior music - 2
Easy but teacher made it confusing – 1
Difficult – 4 (one dropped at midterm from difficulty)

What do you think about the content of the class?

Good – 1
Knew it already – 2
Thought the content was too detailed (constructing scales, circle of 5^{th}, etc) – 2
Recorder is useless instrument to learn – 4
Content needed to be simpler – 1
Felt like the content to be learned would not be useful to them (pointless) – 3
Felt there should be upper and lower level - 1
Felt the course was outdated (learned the recorder in grade school) - 1

Did the instructor explain why this class is important (the usefulness of the class)?

No – 8
"Need it for *Music for Elementary Teachers* class" – 2
"You will use some music in your class and some schools don't have a separate music teacher" – 1
Can't remember - 1

Who was your teacher for the class? Was it a graduate assistant or a professor?

Professor – 7
Graduate assistant – 8

If you could change an aspect of the class, what would you change? Why?

Wouldn't make the class a requirement – 3
(one person suggested having to take only one of the classes instead of both)
No Recorders – 5
More practice on the recorders - 2
Make it more fun or exciting - 3
Made no comments on changes – 2
No concert reports – 1
Don't focus so much on the piano – 1

How do you feel about music in general. Do you think music is an important part of elementary education?

Somewhat important - 2
Important – 9
Very important – 2
Important but "not the way it was taught here" – 1

- Thought there would always be a music teacher – 5

- Felt that music was important but the children should just now about styles of music without learning the notes, etc.

When learning key signatures, intervals, scales, etc., were the materials given to you enough to help you understand?

Yes, the materials were adequate and understandable – 2
No, the materials were confusing and the explanations unclear – 6
Felt Basic Music was a valuable class - 1
Can't remember if it was clear - 1
"The instructor went too fast and got frustrated when students didn't catch on" – 1

Would you have benefited from using a computer program that "drilled" you on these things?

Yes – 14
Felt computer program would be helpful and should be required (not optional) - 1
Felt the materials were sufficient – 1

Please comment on any other aspect that you would like to see changed or give other general comments here.

Make it clearer that you can test out of the class – 3
Thought Basic Music was a valuable class – 1
Felt Basic Music was pointless, not useful, or a waste of time – 3
Wonders why both music classes are required – 1
Aggravated with graduate assistant who became frequently flustered and left students to figure it out by themselves – 2
Base the class more on singing than playing an instrument – 1
Would like to see more computer-based instruction in Basic Music – 1
Felt that if elementary students were taught everything the elementary ed. majors were learning, it would turn the elementary students away from music – 1

Appendix D

Permission to

Use Computer Programs

For Research

Subject: Permission to use a product
Date: Wed, 19 Nov 1997 17:17:21 -0600
From: Lorena Smith <smithlor@esuvm.emporia.edu>
To: tami_strang@wadsworth.com

My name is Lorena Smith. I'm a graduate teaching assistant working on two master's degrees, one in Music Education and one in Instructional Design & Technology. I'm working on a thesis/project where I am attempting to integrate technology and CAI programs into a "traditional, lecture-based" music class. I consulted Mr. J. Brian Post, the music theory instructor at Emporia State University and asked if he knew of any Windows-based computer programs that will drill the students on the fundamentals of music notation. He had several copies of a book that includes a program diskette titled "Foundations of Music" by Robert Nelson and Carl J. Christensen, published by your company in 1997. The ISBN is 0-534-50740-9 (DOS version).

I would like to get permission to use this program on 20 computers as part of my research thesis. I am planning to implement several types of technology into the Spring 1998 semester. The other program I am planning to implement is called Recorder Teacher and the author has granted an extremely low permanent site license to me so that I can study the program's effectiveness. Anyway, if I am allowed to use this program for research, the music department will most likely continue to purchase the program for future use. In addition, I will give full acknowledgement of your and/or the authors' cooperation.

I may need to contact the authors directly. If that is so, do you have a contact number or e-mail address for at least one of them. Thanks,

Lorena Smith
722 Watson (home)
Emporia, KS 66801

Emporia State University
Division of Instructional Design & Technology
1200 Commercial, Emporia, KS 66801

Subject: Nelson/Christensen software
Date: Fri, 21 Nov 1997 13:24:49 -0800
From: Jay_Hu@Swpco.com
To: Smithlor@esuvm.emporia.edu
CC: Clark_Baxter@Swpco.com

Dear Ms Smith,
Clark Baxter, the editor of Nelson/Christensen infoms me there is no problem with you using the Nelson/Christensen software for your research. Robert Nelson can be reached at rsnelson@jetson.uh.edu
Carl Christensen can be reached at 408/755-6700.

Sincerely,
Jay Hu

Subject: Re: Recorder Teacher
Date: Fri, 14 Nov 97 23:31 GMT0
From: jchild@cix.compulink.co.uk (John Child)
To: smithlor@esuvm.emporia.edu

Lorena: . . . now I need a price for 40 copies.

John: ... 70 dollars will suffice unless disks are needed (see below).

Lorena: Will you want her to send you the check first or do you want to bill us when you send the programs?

John: I would now prefer a check for the above amount. Please regard this email as an invoice, to reduce further paperwork.

Lorena: ... do you plan to send hard copies of the program or just give me 40 codes for the present downloaded version. I assume Dr. Miller would prefer to have actual hardcopies with installation instructions. Not all her future graduate assistants may be as computer literature as I. If will cost more for diskette copies, let me know.

John: I think it easiest for you to use the downloaded program. You can make as many copies of the file RTinst92.EXE as you need. As you know, installing is just a matter of running that file on each computer. I will email you the code to go with each name you care to supply (up to 40). As you know, entering the code number entails clicking 'for the rich' and following on-screen instructions. If you would like me to I will send very detailed instructions in the form of an email which you could print out and place in the folder with each machine. For me to send you a disk and instructions for each machine I would have to charge about 5 dollars each, which I'm sure is prohibitive and unnecessary.

Lorena: Considering that fact that about 120-150 students per semester will be viewing and using the program, I think the exposure will serve you well.

John: A point that had not escaped me! Be assured I will continue to be co-operative!

Lorena: I, at least, will do my part in the marketing of the program...especially in light of the fact that you have been so gracious. By the way, what did you use to program it? (Toolbook, visual BASIC, or actual programming languages). Just curious since I dabble in authoring a little myself.

John: Thank you for the kind words. I originally wrote the program (including all the animations)in qbasic in 1986(!), then used Delphi to convert it to windows and to add the multimedia elements.

- John Child -

Port Reeve
East Street
Mayfield
East Sussex
England U.K.

Subject: Re: Recorder Teacher
Date: Thu, 13 Nov 97 23:15 GMT0
From: jchild@cix.compulink.co.uk (John Child)
To: smithlor@esuvm.emporia.edu

Lorena: Is the site license for one year, one semester, or forever. If it needs to be renewed each year what is the cost?

John: For your organization I will make it "forever". I may introduce a 'per year' charge to other organizations so if you know of anyone else who might like it they should hurry.

Recorder Teacher runs very well on a Mac with 'Soft windows' installed. There is no separate version specifically for the Mac.

Have you seen it on a network yet?

It has been suggested to me that normally the establishment with whom you are studying pays for your expenses for materials etc etc. I expect you have been into all that though?

Kind regards

-John Child

Subject: Re: Recorder Teacher
Date: Mon, 10 Nov 97 19:31 GMT0
From: jchild@cix.compulink.co.uk (John Child)
To: smithlor@esuvm.emporia.edu

The code is 5773. Please restrict this to one computer only. Please enter the following for your name:-

Lorena's own complimentary copy

I hope the program will be of much benefit. Please give me some feedback as to the benefit (or especially the lack of benefit). I rely on registrations to be able to afford to live!!! At the same time I want to give youngsters something worthwhile to do with their time, as you do.

If a site license is required, covering up to 50 computers, this is 95 dollars and can be obtained directly from my web site. Alternatively I can negotiate for a price per computer. I am encouraged by the uptake from educational establishments on both sides of the Atlantic, and even Norway! Good luck.
- John Child -
- http://ourworld.compuserve.com/homepages/john_child/

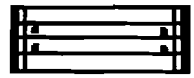
Appendix E

Class Web Pages

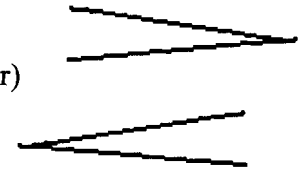
Mid Term Review

TERMINOLOGY

1. Notation

- Repeat sign 

2. Dynamics

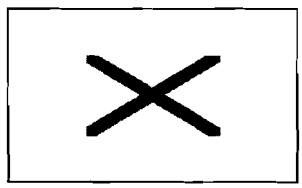
- Decrescendo (gradually getting softer) 
- Cresendo (gradually getting louder)
- Piano (soft) *p*
- Mezzo piano (medium soft) *mp*
- Mezzo forte (medium loud) *mf*
- Forte (loud) *f*

3. Accidentals

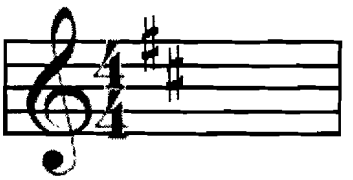
- Sharp (raises pitch 1/2 step) ♯
- Flat (lowers pitch 1/2 step) ♭
- Natural (no alterations in pitch) ♮ ♮
- Double sharp (raises pitch 1 step) **X**
- Double flat (lowers pitch 1 step) 𝄫

4. Rhythm and Meter

- Beat (constant steady pulse)
- Rhythm (changing long/short patterns)
- Tie (two adjacent notes of same pitch connected & played as one



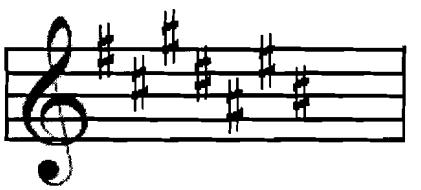
- Staccato notes (a dot either above or below note head tell you to play the note short)
- Time signatures (2/4, 3/4, 4/4, etc.) Be able to locate it on the staff.

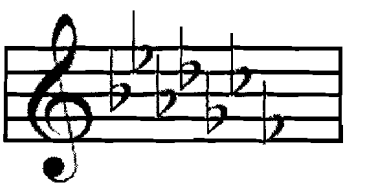


5. **Know the classification groups for various musical instruments**
   - Percussion, strings, brass, woodwinds

6. **Name the musical pitches** (A, B, C, D, E, F, G)
   - Locate pitches on keyboard (click on either of these links to go to the keyboard graphic)
   - Locate accidental pitches on the keyboard

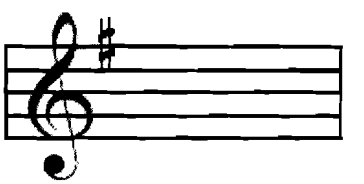
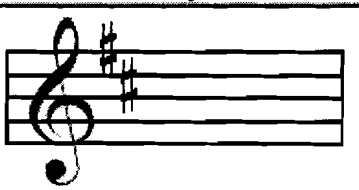
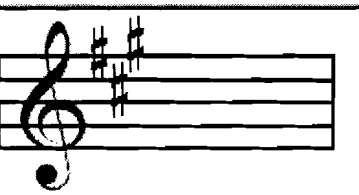
7. **Constructing Key Signatures and Major Scales**
   - Place the sharps and flats in correct order on the staff as a key signature.

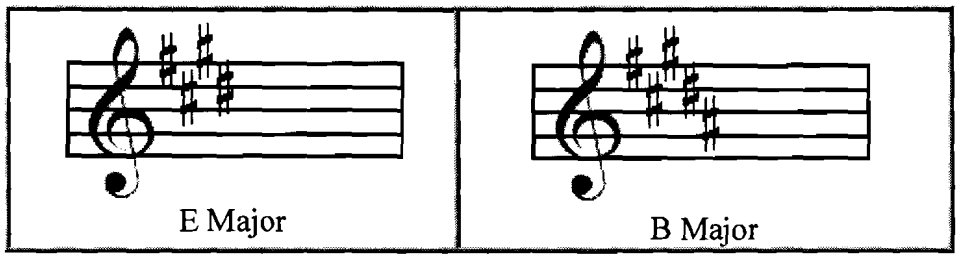




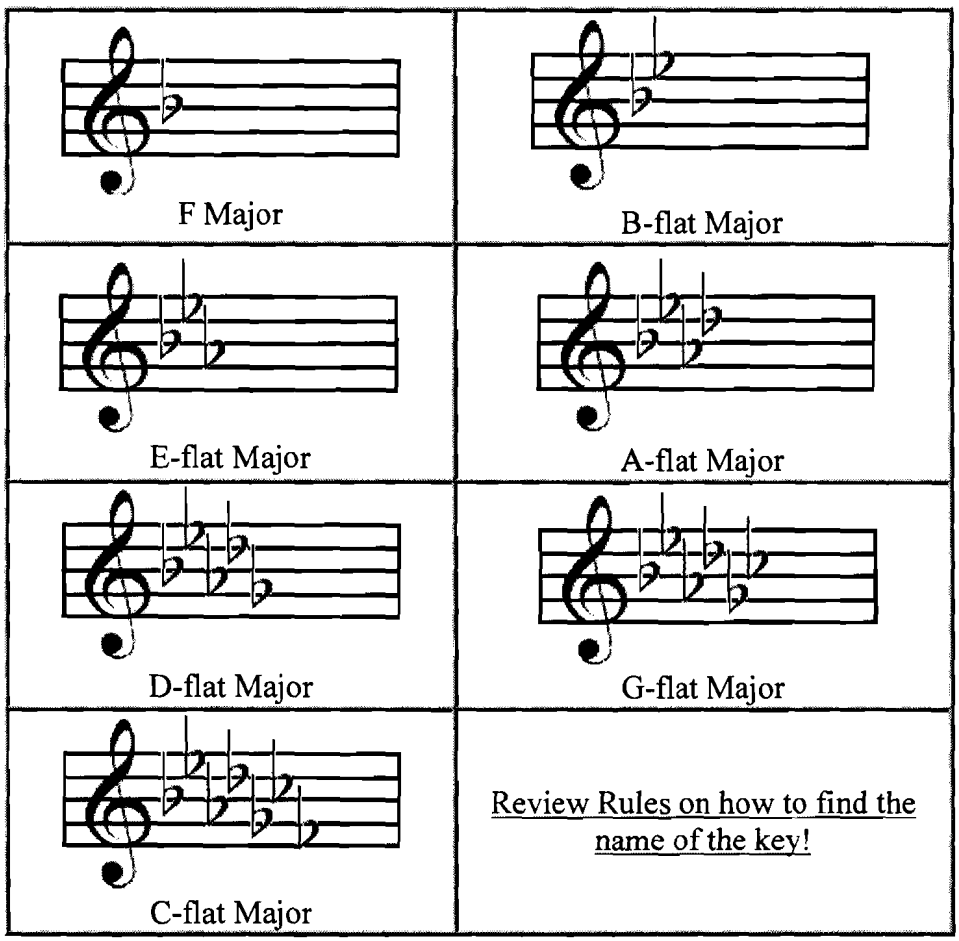
   - Identify the major keys.
     - Go to Flat Keys

Key of C and SHARP KEYS

 C Major	 G Major
 D Major	 A Major



FLAT KEYS (Go to Sharp Keys)



- Build major scales. Place sharps or flats in the key signature.
  - RULE: WWHWWWH (whole step, whole step, half, whole, whole, whole, half)
  - See Fundamentals of Music program - module 4.

  - See MiBac Music Lessons program - &

8. Rhythm patterns

- Count rhythmic patterns. Place proper time signature at the beginning.
- Add measure lines to rhythmic patterns according to time signature given.

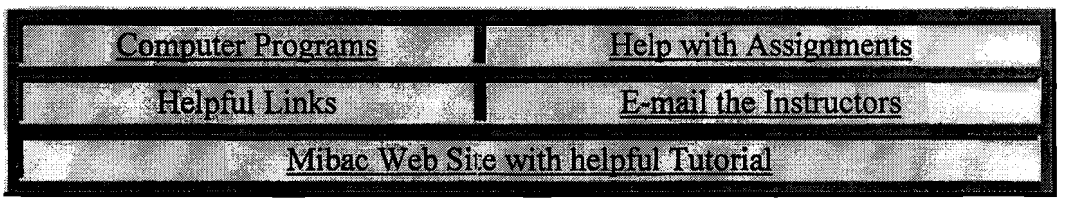
    - See Fundamentals of Music - Module 2-3
    - See Mibac 
- Complete measures with proper rhythms according to time signature given.
    - See Fundamentals of Music - Module 2-3

9. Know recorder fingerings for F, G, A, B, C, and D.
(see Recorder Teacher or Fingering Chart)

Welcome to
MU-124 Basic Music

This site is intended to provide supplemental information to the students enrolled in MU-124, Basic Music.

If you have problems with the computer programs or this web site, contact Lorena Smith.



Mibac Music Lessons

- This program will drill you on note names and where they are located on the piano and staff. Another module will help with note durations and a third module will help with key signatures. The most helpful feature of this program is the extensive HELP which provides simple, clear definitions of music terms as well as explanations of the music concepts (e.g. what is a key signature). It defines a concept and shows examples.
- This program is located in the Basic Music Programs folder on the computer desktop. Double click the folder and then double click *Mibac Music Lessons*.

Only three will be of use to you:

Drills note names on the piano and staff.

 Drills key signatures


Drills note durations. This deals with fractions and may be confusing. If so, use the note duration drill in the Fundamentals of Music program.

Fundamentals of Music

- This is a DOS-based program (although you can use a mouse) that will drill you on rhythms, key signatures, notes on the staff and other music fundamentals.
- This program is located in the Basic Music Programs folder on the computer desktop. Double click the folder and then double click *Foundations of Music*.
- Specific Modules to use:

Module 2	Note Values - Names and Equivalents Note Values - Including Dots & Ties Rests Pitch Naming Pitch Writing Keyboard
Module 3	Inserting Barlines - Simple meters Completing Measures - Simple meters
Module 4	Whole & Half Steps on the Keyboard Whole & Half Step Recognition Whole & Half Step Spelling Enharmonics Major Scale Writing Major Scale Spelling Major Scale Recognition Major Key Signature Spelling Major Key Signature Recognition
Module 5	Inserting Barlines - Compound meters Completing Barlines - Compound meters
Module 6	Minor Scale Writing Minor Scale Spelling Minor Scale Recognition Minor Key Signature Spelling Minor Key Signature Recognition Key Signature Recognition - Major & Minor
Module 9	Interval Writing Interval Spelling Interval Recognition
Module 10	Triad Writing Triad Spelling Triad Recognition
Module 12	Musical Terms

Recorder Teacher

- This program is designed to help you learn fingerings and where those notes are on the staff. Includes a complete fingering chart.
- This program is designed for elementary students and older and should be easy to negotiate without a tutorial. Keep this program in mind for your future elementary classrooms, should you be required to teach music as part of your teaching assignment.
- All of the modules in this program are helpful. Use any that will help you.

TOP

Lorena Smith, Lab coordinator
Dr. James Swain, Coordinator of Basic Music - all sections.
Stephanie Schwenk, GTA Instructor
Jon Warrick, GTA Instructor

Assignments

You should use the following computer modules to help with each specific assignment.

Assignment 1	Assignment 2	Assignment 3
Assignment 4	Assignment 5	Assignment 6
Assignment 7	Assignment 8	Assignment 9
Assignment 10	Mid-Term Review	Final Review

Back to main page

Assignment 1 **TOP**

Mibac  and  (deals with fractions - you may want to use the Foundations program)

Foundations of Music

- Module 2
  - Note Values - Names and Equivalents
  - Rests
  - Pitch Naming
  - Pitch Writing
- Module 3
  - Inserting Barlines - Simple meters
  - Completing Measures - Simple meters

TOP

Assignment 2 **TOP**

Same modules as #1

Mibac -  and 

Foundations of Music

- Module 2
  - Note Values - Names and Equivalents
  - Rests
  - Pitch Naming
  - Pitch Writing
- Module 3
  - Inserting Barlines - Simple meters
  - Completing Measures - Simple meters

TOP

Assignment 3 **TOP**

(Same as above with one addition)

Foundations of Music

- Module 2
  - Note Values - Names and Equivalents
  - Rests
  - Pitch Naming
  - Pitch Writing
  - Keyboard
- Module 3
  - Inserting Barlines - Simple meters
  - Completing Measures - Simple meters

TOP

Assignment 4 **TOP**

Foundations of Music

- Module 2
  - Pitch Naming
  - Pitch Writing
  - Keyboard
- Module 4
  - Whole & Half Steps on the Keyboard
  - Whole & Half Step Recognition

TOP

Assignment 5 **TOP**

Foundations of Music

- Module 2
  - Note Values - Names and Equivalents
  - Note Values - Including Dots & Ties
  - Pitch Naming
  - Pitch Writing
  - Keyboard
- Module 4
  - Major Scale Writing
  - Major Scale Spelling
  - Major Scale Recognition

TOP

Assignment 6 **TOP**

Foundations of Music

- Module 2
  - Note Values - Names and Equivalents
- Module 4
  - Major Scale Writing
  - Major Scale Spelling
  - Major Scale Recognition
  - Major Key Signature Spelling
  - Major Key Signature Recognition

TOP

Assignment 7 **TOP**

Foundations of Music

- Module 5
  - Inserting Barlines - Compound meters
  - Completing Barlines - Compound meters
- Module 10
  - Triad Writing
  - Triad Spelling
  - Triad Recognition

TOP

Assignment 9 **TOP**

Foundations of Music

- Module 4
  - Major Scale Writing
  - Major Scale Spelling

- Major Scale Recognition
- Major Key Signature Spelling
- Major Key Signature Recognition

TOP

Assignment 10 TOP

Foundations of Music

- Module 6
  - Minor Scale Writing
  - Minor Scale Spelling
  - Minor Scale Recognition
  - Minor Key Signature Spelling
  - Minor Key Signature Recognition
  - Key Signature Recognition - Major & Minor
- Module 10
  - Triad Writing
  - Triad Spelling
  - Triad Recognition

TOP

Appendix F

Screen Shots of Music Madness

(Self-authored, computer-based, tutorial module)

Music Madness

Please enter your name in the

Name

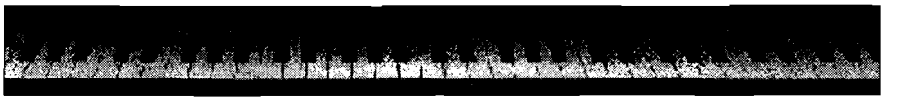
Name

Name

Name

Name

Start

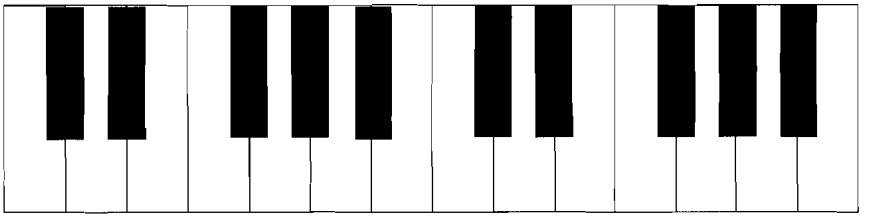


Designed by Lorena Smith

Notes on the Keyboard Drill

Locate on the keyboard the note requested.
Ready?

Go!



General Info Quiz

Review

Drill _Practice Me

Appendix G

End of Semester Student Questionnaire

1. What classification are you? (Fr, Soph, etc.)_____ Male or Female

2. Which GTA did you have?_____

3. What past music training have you had?
   - Piano lessons: How long? _____
   - Another instrument? What?_____ How long?_____
   - School choir: How long? _____
   - Church choir: How long?_____ How old were you?_____
   - Band: How long?_____ What grade were you in?_____
   - Other_____

4. Are you an elementary education major? No Yes
   If not, what's your major?_____

5. Is this specific class a requirement for your degree? No Yes
   - Or, did you choose this one over another class to fill your requirement? No Yes
   - Was this class completely an elective on your part? No Yes

6. Were you nervous about taking the class? No Yes
   Why?

7. Did you think this class was too difficult? No Yes
   Too Easy? No Yes
   Why?

8. Did you know about the "test-out" option? No Yes

9. How do you feel about music in general. Do you think music is an important part of elementary education?

10. What did you "hear" about this class prior to taking it?

11. How did you feel about having the class in Visser Computer lab? Any suggestions?

12. When dividing the class in half, did the recorder playing group bother those of you at the computers? No Yes

13. Did you ever use the computer programs outside of class? No Yes
    How many times?_____
    Did you ask for your own copy of any of the programs? No Yes

13. Did you explore any extra modules in the computer programs (those not suggested in class)? No Yes

14. In your opinion, was the reason for learning to play the recorder explained thoroughly enough at the start of the class? No Yes

15. Did the computer programs help you? How?

16. In your opinion, was the reason for having to take this class explained well enough at the beginning of the semester? No Yes

17. If you could choose only one computer program for future classes to use, which program do you think we should use?

    Recorder Teacher Mibac Music Lessons Fundamentals of Music Find another one

18. How many times did you access the web page (approximately)? _____

19. Did you find any of the information useful on the web page? If so, what?

20. What suggestions to you have for the web page?

21. Would you use Recorder Teacher in your elementary classroom if you were asked to teach elementary students a component of music? No Yes

22. Did you ever access the help (tutorial) information in the Mibac Music Lessons program? No Yes

23. How did the addition of the computer programs change how you feel about this class?

24. Did you feel that using the programs made the class more "fun" for you? Provided variety? Or did you feel that using the computers just added more for you to do?

25. Did you enjoy using the computers? No Yes
Why?

26. If given a choice, would you choose to take this class with or without the computer programs? Without With

27. What grade do you think you have in this class?_____

28. Overall, did you learn something new in this class?

29. Have you used computers much in the past?

30. Did your computer skills improve any as a result of this class? No Yes

Please give any other comments you'd like here:

THANK YOU SO MUCH FOR YOUR HELPFUL FEEDBACK!!!

I, Lorena Smith, hereby submit this thesis/report to Emporia State University as partial fulfillment of the requirements for an advanced degree. I agree that the Library of the University may make it available to use in accordance with its regulations governing materials of this type. I further agree that quoting, photocopying, or other reproduction of this document is allowed for private study, scholarship (including teaching) and research purposes of a nonprofit nature. No copying which involves potential financial gain will be allowed without written permission of the author.

Lorena Smith

Signature of Author

8/2/99

Date

Implementing Technology into the Curriculum: Assessing the Attitudes and Motivation Levels of Elementary Education Majors Toward the Integration of Technology for Learning the Basic Fundamentals of Music - A Case Study.

Title of Thesis/ Research Project

Doug Cooper

Signature of Graduate Office Staff

August 5, 1999

Date Received