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The Benefits of Music Software in the Music Classroom: Expropriating Technology

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Introduction

The use of technology in education has been a part of the school curriculum since the early 20th century. However, since then, many questions have emerged seeking answers on how to use technology to appropriate an innovative music classroom and to create effective music curriculum. The purpose of this paper therefore is to examine the innovative music classroom using technology to enhance a music curriculum that transforms the way music can be taught and learned using technology. To achieve this goal, we looked at the effective practices in teaching, the factors to be considered during effective curriculum development, selecting of teaching software and the application of brain-based learning principles a pedagogy in the music classroom. In the investigation, the main areas of concentration included but not limited to effective practices in music teaching and learning; effective curriculum in music education; criteria for the selection of effective educational software for the teaching of music; and description of effective presentation in music education class. With the advent of technology in music education, effective music teaching, curriculum development, the selection of appropriate teaching software, and presentation in music education are fundamental issues affecting the 21st century classroom practices. During the time when technology was just becoming a central pedagogical tool, in his research almost two decades ago, Cuban (1986) observed that many teachers fundamentally used technology as a catalyst in problem-solving and in boosting student-learning outcomes. This was because technology proved to support the development of deeper learning skills and critical thinking (U.S. Department of Education, 2014). In addition, he noted that technology was capable of supplying relevant and meaningful content that get students to reason and create new ideas. Since then, many scholars have discovered that Technology can transform the classroom into an interactive learning environment

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and that technology can be used to restructure and redesign the classroom to produce an environment that promotes the development of higher-order thinking skills (Christen, 2009; Kurt, 2010; Keser, Huseyin, & Ozdamli, 2011; Costley, 2014). A premium is placed on teaching students content and critical-thinking skills, whereas less time is spent teaching students to develop effective techniques and strategies to guide learning (Dunlosky, Rawson, Marsh, Nathan, & Willingham, 2013). This paper examines the innovative music classroom using technology to enhance music teaching and learning.

Effective Practices in Music Teaching and Learning

Teachers should be ready to guide, direct, and keep alive the children's enthusiasm for learning, without interfering with the child's effort to teach himself (Hainstock, 1968, p. 10). Teachers should be observers, always ready to guide and direct, and their purpose is to keep alive the children's enthusiasm for learning, without interfering with the child's effort to teach himself (Hainstock, 1968, p.10). This standpoint has since been overtaken by the new research such as the one on effective method of teaching musicianship using games as Max Dalby explains in The Instrumentalist on her topic on Teaching Musicianship with Games (Dalby, 1992, p.21). In this journal, Dalby reiterated that the most effective ways of teaching musicianship is by using software that has games that offer variety and excitement (p. 21).

Research into the effective teaching practices has revealed several issues. No single specific observable teaching style has been found whose frequency or percentage of occurrence has invariably and significantly correlated with student achievement (Wiliam & Leahy, 2015). Teaching styles have been split into various clusters by different researchers. Ellington *et al.* (1993) categorize teaching practices into four groups thus lectures and talks, Video presentations, Educational broadcast and Practical activities. Bennett (1976) puts them a little differently into two main categories of Traditional and Progressive. Bennett's Teaching Styles and Pupil Progress of (1976) seems to have the broader categories under which the other sub-categories can be classified. In his attempt to define the two approaches, Bennett summarizes his two teaching practices in a definitive manner. Progressive styles, which Kartazyna and Jaszczolt (2006) called the heuristic approach are defined by Bennett (1976) as a type of teaching marked with interaction between the learner and the teacher. This approach tended to be popular in college level especially in the teaching of music. The use of technology was found to be instrumental in the realization of the heuristic approach.

The use of technology in music education, effective music teaching, curriculum development, the selection of appropriate teaching software, and presentation in music education are fundamental issues in our current times. At the onset of technology in the classroom, in his research almost two decades ago, Cuban (1986) observed that many teachers had discovered technology to be a fundamental catalyst in problem-solving and for motivating students to learn. Since then, current educational enterprises have noted that technology is capable of supplying relevant and me-aningful content that get students

to reason and create new ideas (Petrosino & Dickinson, 2003). Using computers and the internet has become an integral part of our lives and have ultimately been tapped as effective practices in music education. Therefore, one of the greatest vehicles for the 21st century is using technology for effective and permanent learning (Costley, 2014). In the 21st -century, mentioning technology generally inspires thoughts of advancement, improvement, and progress (Dunmire, 2010).

Effective Curriculum in Music Education

Curriculum has in the past decades been gleaned from a utilitarian purview impinging upon the society (Pinch & Bijker, 1987; Budé, Imbos, van de Wiel, & Berger, 2011). As in the past, this societal point of reference is also reflected in contemporary educational dialog and practices. Technological literacy for students is a prime concern of the U.S. Government (U. S. Department of Education, 2010). As result, the 21st century curriculum must also embrace technology. As early as 1944, Pitts came up with ideologies on the effective curriculum. Pitts observed that an effective music curriculum is too elusive to define. Research has shown that many conclusions are aimed at the music curriculum being concerned with a mode of living richly (Pitts, 1944, p.112). Several researchers in curriculum studies have defined music curriculum differently but on a continuum. According to Pitts (1944), music curriculum should be looked from the social perspective in a changing world. He contends that:

> A functional music curriculum ought to have a ground plan that would be inviting and easy for the principal participants to move about in; moreover, that whatever organization it is possible to achieve, an advance layout must, of necessity, be suggestive of defaults which will stimulate continuing lines of inquiry and action. (p.112)

Other researchers have looked at the music curriculum from a theoretical perspective of human intelligence which Gardner (1991) has defined as autonomous from other human capacities having a set of information-processing operations and a distinct history in the stages of development through in evolutionary history. In this theory of human intelligence, Gardner suggests at least eight ways that people have of perceiving and understanding the world. Gardner labeled each of these ways a distinct “intelligence”--in other words, a set of skills allowing individuals to find and resolve genuine problems they face. Gardner (1991) equated all the facets of intelligence to a good curriculum and noted that “when any form of education is practiced in an effective manner, the curriculum speaks for itself” (p.195). While Gardner suggests his list of intelligence may not be exhaustive, he identified the following eight: (a) Verbal-Linguistic which had to do with the ability to use words and language. A curriculum component that was highly recommended by Shinichi Suzuki as Cooney (1993) concurs in his From Plato to Piaget. By implication, Suzuki meant that a good curriculum should employ the language of the learner; (b) Logical-Mathematical which predominantly deals with the capacity for inductive and deductive thinking and reasoning, as well as the use of numbers and the recognition of

abstract patterns; (c) Visual-Spatial which deals with the ability to visualize objects and spatial dimensions, and create internal images and pictures; (d) Body-Kinesthetic which deals with the wisdom of the body and the ability to control physical motion; (e) Musical-Rhythmic which deals with the ability to recognize tonal patterns and sounds, as well as a sensitivity to rhythms and beats; (f) Interpersonal--The capacity for person-to-person communications and relationships; (g) Intrapersonal which deals with the spiritual, inner states of being, self-reflection, and awareness; and (h) Naturalist intelligence is one that involves how sensitive an individual is to nature and the world.

Music software can impact multiple intelligence during the learning process. Several scholars have examined the role of multiple intelligence in learning by incorporating it into the traditional school Curriculum such as the verbal-linguistic and logical-mathematical intelligence. The utilization of smart tools and technologies has provided easy and convenient education in an effective way without barrier of time and place (Mankad, 2015). It may be helpful to consider software that incorporates the theory for assessment methods of the effective curriculum that take into account the diversity of intelligence, as well as self-assessment tools that help students understand their intelligence. Gardner (1991) hypothetically concurred that an effective curriculum must be that which is favored by most teachers - even such assessable curriculum is void if the teachers do not like the curriculum.

Criteria for the Selection of Effective Educational Software for the Teaching of Music

Effective software in music education should contain elements of cognitive reasoning. Cognitive reasoning should entail problem-solving strategies. There are many kinds of problem solving techniques. In this paper we apply the idea proposed by Hall (1960) who posits that the most prevalent form of thinking, but rather a reasoning where the learner is capable of being highly conscious, directed, controlled, active, purposive, intentional, forward looking and forward going, and goal-oriented. The most effective software should therefore be that which stimulates the consciousness of the learner with a well formulated task that continues until a solution is achieved. An effective software as pedagogical tool can also be gleaned from the context of trace elements theory and learning maturity as theoretical framework in this paper (Manzo & Casale, 1990).

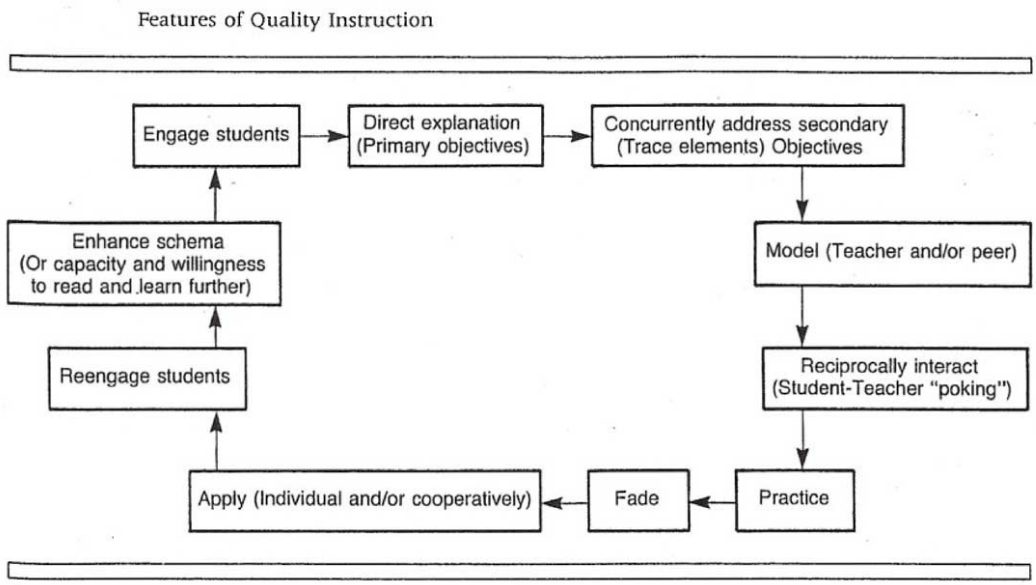


Figure 1. Trace elements theory Adopted from Manzo and Casale (1990)

As shown in Figure 1, the trait elements theory by Manzo and Casale (1990) demonstrates a pedagogical framework that effective software developers need to adopt embrace in order to ensure effective instruction. The theory states that progress towards [learning] maturity is best achieved when he educational 'diet' includes nourishment in a wider array of subtle skills, abilities, attitudes, and inclinations (p.100). Effective music software would therefore begin my engaging the student with the primary objectives of the lesson. Such objectives should reflect the music standards of the National Association for Music Education (NAfME, see Table 1).

Table 1. Music Standards adapted from NAfME, as a part of the National Coalition for Core Arts Standards (2014)

National Standard	Proficient	Accomplished	Advanced
CREATING	MU:Cr1.1.T.Ia Generate melodic, rhythmic, and harmonic ideas for compositions using digital tools. ***Suggested Software:*** Making Music, Music Ace Maestro, Band-in-a-Box	MU:Cr1.1.T.IIa Generate melodic, rhythmic, and harmonic ideas for compositions and improvisations using digital tools. ***Suggested Software:*** Maestro, Garage Band,	MU:Cr1.1.T.IIIa Generate melodic, rhythmic, and harmonic ideas for compositions and improvisations that incorporate digital tools. ***Suggested Software:*** Sibelius, Finale,

PERFORMING	MU:Pr4.I.T.Ia Develop and explain the criteria used for selecting a varied repertoire of music based on interest, music reading skills, and an understanding of the performer's technical and technological skill. ***Suggested Software:*** Carry a Tune, Sing, Music Ace Maestro, ECS Tap-it,	MU:Pr4.I.T.IIa Develop and apply criteria to select a varied repertoire to study and perform based on interest; an understanding of theoretical and structural characteristics of the music; and the performer's technical skill using digital tools. ***Suggested Software:*** Rhythm Practice, Alfred Teach Yourself to Play Piano	MU:Pr4.I.T.IIIa Develop and apply criteria to select varied programs to study and perform based on interest, an understanding of the theoretical and structural characteristics, as well as expressive challenges in the music, and the performer's technical skill using digital tools. ***Suggested Software:*** Error Detection, SmartMusic, Music Minus One Series
RESPONDING	MU:Re7.I.T.Ia Respond to music based on the use of the elements of music, digital and electronic aspects, and connections to interest or purpose. ***Suggested Software:*** Animusic I and II, Sibelius.	MU:Re7.I.T.IIa Select and critique contrasting musical works, based on manipulations of the elements of music, digital aspects, and the purpose and context of the works. ***Suggested Software:*** Carry-a-tune.	MU:Re7.I.T.IIIa Select, describe and compare a variety of musical selections based on characteristics. ***Suggested Software:*** Finale, Band-in-a-Box
CONNECTING	MU:Cn10.0.T.Ia Connect knowledge and skills relate to personal choices and intent when creating, performing, and responding to music. ***Suggested Software:*** ECS TimeSketch Series Silver Burdett's Animated Listening Maps	MU:Cn10.0.T.IIa Connect knowledge and skills to personal choices and intent when creating, performing, and responding to music. ***Suggested Software:*** Great Composers Series	MU:Cn10.0.T.IIIa Connect knowledge and skills to personal choices and intent when creating, performing, and responding to music. ***Suggested Software:*** Zane Home and History Library

The software would then allow students to reciprocally interact between the software and the student until the student is confident by way of repeated practice. This leads to what Manzo and Casale (1990) have called 'fading' (p.100). After that the students will be able to apply the acquired knowledge. For the music software to be used effectively several things need to be considered. It is common knowledge that teaching/learning software, especially as produced in the past, has not always produced sound educational practice (Brock, 1994). Too often, software did not take full advantage of the microcomputer capabilities. In the same light, Maffei (1986) found that:

> Before we begin integrating software into the classroom lesson, teachers should be aware of classifications in instructional software. Certain programs stress drill and practice of the basic facts while others attempt to teach by placing the student in a learning situation that stimulates the real thing." (p.39)

It is likely that by personally previewing the educational courseware (Brock, 1994), the most effective software will be explicitly identified by the teachers. The software should be evaluated based on four categories of variables: learning conditions, student characteristics, materials, and criterion tasks (Dunlosky, Rawson, Marsh, Nathan, & Willingham, 2013). Brock also recommended that before adapting the usage of any computer courseware, teachers should be able to talk to colleagues, and borrow trial software or demos to evaluate. Different software required different hardware and general system types. Knowledge of types of software helps the teacher to choose an appropriate application program to meet a specific objective (Maffei, 1986). A cursory observation of general music software worthy of consideration included those in the listing in Table 2.

Table 2. General music software worthy of consideration

Cubase	Mosaic	Music Time
Sibelius	Finale Allegro	Finale 2000
Music Ace	Print Music	Juliard Keyboard
Pro Tools	MacGamut	Logic Pro X
Band in Box	Clare	Voyetra
MiBac	Musicware	GUIDO
Morton Sabutnik	Coda	Musicshop
Vision	MuseScore	PreSonus Notion

Presentation Techniques by Applying Brain-Based Learning Principals

Another important aspect to consider when incorporating music technology in music education is the concept of brain-based learning (BBL). Current research in the field of BBL is gleaned from the combined work of neurologists, biologists, psychologists, educators, and physicians. Jensen (2000) defines BBL as learning in accordance with the way the brain is naturally designed to learn. (p. 6). The most important aspect of BBL is that it encompasses and combines specific types of research-based academic interventions as well as applied aspects of emotional learning which are currently being explored through innovative technology. Music technology utilizes auditory environment which has been described as important in the classroom due to its ability to influence neuronal plasticity. Neuronal plasticity, the brain's adaptation and reorganization as a response to its direct experience of various forms of stimulation, is a widely recognized concept of increasing interest to many brain researchers (Sappey-Marinier ***et al.***,1992). Music lessons which technology is incorporated tend to employ a great deal of auditory communication and instruction which are necessary for brain-based learning.

Music technology software in brain-based pedagogy serves to carry information to the learner and to arouse student performance (Akombo, 2013). Listening to music engages the entire brain and stimulates learning (Jensen, 1995). Music can be used in the brain-based learning environment to achieve various learning objectives such as providing a multi-sensory learning experience that enhances memory, establishing a positive learning atmosphere, and developing rapport with the student (Baker, 2011; Akombo, 2013). Brain-based learning principles offer music educators a new perspective on how students

learn music and how teaching of music can be developed to correspond to meet student needs. Students arrive in the classroom with an often bewildering range of academic abilities and life experiences. By understanding student learning types, innovative teaching strategies, and how memory and learning are affected in the auditory environment, instructors might enrich the learning experience of all students (Baker, 2011). Today's diverse music classrooms present a perfect setting for technological innovations. Not only is the music technology software more culturally diverse than ever before but also the current technologies include exercises of every cognitive level within the same learning module some of which are extrapolated from Bloom's taxonomy of learning objectives.

Methodology

Subjects

Subjects for this study were selected from a population of high school music teachers in a central Florida School District in the United States of America. The researcher selected four most commonly used music courseware that required extensive use of technology, software, CDs, e-mail, on-line discussions, videocassettes, etc from the pool of teachers using educational software to teach music. These included: *Voyetra, Finale Allegro, Sibelius*, and *Music Time*. *N=22* Participants employed as music teachers teaching music in the K-12 public schools participated in the study. Ninety-three percent of all the participants were full time or regular classroom teachers and 7% were part-time. Eighty-five percent of respondents were advancing their knowledge online through web-based programs as well as evening part-time classes and by CD ROMS at home.

Instrumentation

A questionnaire was designed to identify characteristics of the most effective music software in the teaching of music in the classroom. The twenty-four item questionnaire was developed based on at least four of some of the categories in the literature as follows: (1) demographic characteristics, such as, age, gender, marital status, year of studying music software, etc. (2) experience related to basic computer skills, such as, databases, spreadsheets, word processing, knowledge of the Internet, and e-mail exchange, (3) motivations to use technology in the teaching of music and (4) Reasons for using such the software. The participants were asked to rate the software using a 5-point Likert scale, with 1 as *strongly agree* and 5 as *strongly disagree*. Thus, lower scores are viewed as more positive. The items were worded both positively and negatively to prevent acquiescence bias and then recoded prior to analyses.

Procedure

The 24 responses to questions were configured in terms of four models. In *The Demographic Model* the variables were: Age of teacher, Number of years acquainted with technology, Vocational Level, Employment Status, Occupation Level, Income, and number

of years the teacher has used technology to teach music. In *The Experiential Model* the variables were: Previous Web-Based Experience, Databases, Spreadsheets, WordProcessors, E-Mail, and the Internet. In *The Motivational Model* the variables were: Acquire Knowledge, Personal Gain, Meet Community Goals, Social Reasons, Personal Fulfillment, and Gain global movement on technology. In *The Inhibitory Model* the variables were: Situational Barriers, Institutional Barriers, Dispositional Barriers, and Learning Style Barriers. To examine the most effective software used in the schools, the survey was evaluated using a discriminant function analysis.

Results

The Demographic Model

Of the 220 targeted teachers, 24 (10.9%) responded to a questionnaire identifying their training background and the characteristics of the best software they use in teaching music. Significant mean differences (univariate analyses) between the two groups allowed for the construction of a profile which showed that that the teachers who opted for technology in music classroom were more enlightened technologically, more experienced, and more likely to have the budget to support their computer assisted instruction (CAI) initiatives. Situational Barriers, Institutional Barriers, Dispositional Barriers, Learning Style Barriers were found to be important in considering the type of music software to be used in the classroom. The mean age of teachers who participated in the study was 30.9 years. Which showed that relatively young teachers were using technology more n music teaching as shown in Table 3. The means and standard deviations for the variables in the demographic model are reported in Table 3. The study also showed that all teachers used Internet in their classroom. The most used software were Voyetra and McGamut and both at 90% and 88% usage rate respectively. When asked for the reason for using particular software in the classroom, 90% observed that they were motivated by software which had progressive student tasks. In Table 3 we can see that there is a great significance of teachers using technology in the classroom in order under the Motivational Model ($p<.001$). For some of those online students (59.5%), web experience was accumulated in previous online courses. Table 5 suggests that both Voyetra and MacGamut consist of the characteristics that foster a student-centered learning while providing teacher user-friendliness with 90% of respondents indicating that Voyetra exercises were progressive (See Table 6). Perhaps, in the current “high-tech” milieu the use of CAI in the teaching of music is really seen as easier and therefore appealing to those with fewer pedagogical approaches as well as students with lower learning motivation. Consistent with this interpretation is the demographic observation that teachers using CAI are likely to have a previous technological experience (60%). On the other hand, another explanation could be linked to the motivational model. A more fine-grained analysis of motivation is warranted with respect to CAI perhaps with looking at multiple intelligences, attribution theory, social learning theory, and personality variables. Such an inclusive analysis could present a fuller understanding of the Demographic, Experiential, Motivational; and the Inhibitory models.

Table 3. Means and Standard Deviations for Variables in the Demographic Model

Demographic Model	CAI Techno-Teachers	
	Mean	SD
Age	30.9	9.26
Number of Children	1.02	
Vocational Level	3.3	
Length of Employment	2.3	
Years of Studying tech	5.7	

The Experiential Model

The percentages of the experiential variables in the experiential model are reported in Figure 2.

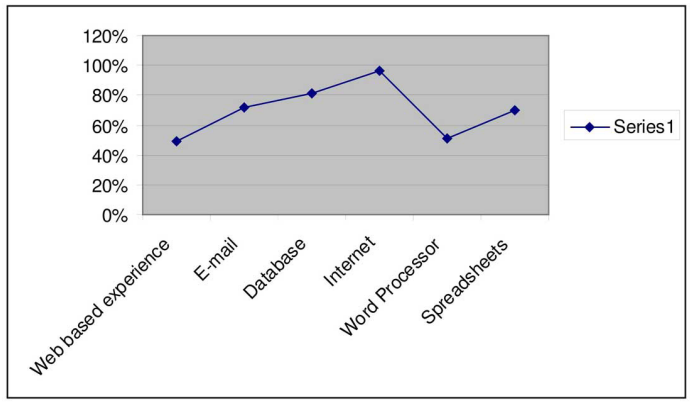


Figure 2. Means and Standard Deviations for Variables in the Experiential Model

The Motivational Model

The means and standard deviations for the variables in the motivational model are reported in Table 3.

Table 3. Means and Standard Deviations for Variables in the Motivational Model

Motivational Model	CAI		
	Mean	SD	Univariate p
Acquire Knowledge	3.44	1.05	NS
Personal Gain	3.10	0.50	<.001
Meet School Board Goals	3.87	0.97	<.05
Social Reasons	4.30	0.69	<.001
Escape a Situation	4.39	0.61	<.05
Fulfill Obligations	2.95	0.65	NS
Personal Fulfillment	3.89	0.92	<.05
Gain Technological Knowledge	4.28	0.85	<.001

Note. Lower scores indicate the more positive attitude.

The Inhibitory Model

Table 4. Means and Standard Deviations for Variables in the Inhibitory Model

The means and standard deviations for the variables in the inhibitory model are reported in Table 4. **Inhibitory Model**	**CAI education**		
	Mean	SD	Univariate p
Situational Barriers	2.15	0.70	<.001
Institutional Barriers	2.53	0.62	<.001
Dispositional Barriers	2.74	0.82	<.001
Learning Style Barriers	2.43	0.71	NS
Note. Lower scores indicate the more positive attitude.			

Univariate Analysis

Table 5. The most commonly used music courseware

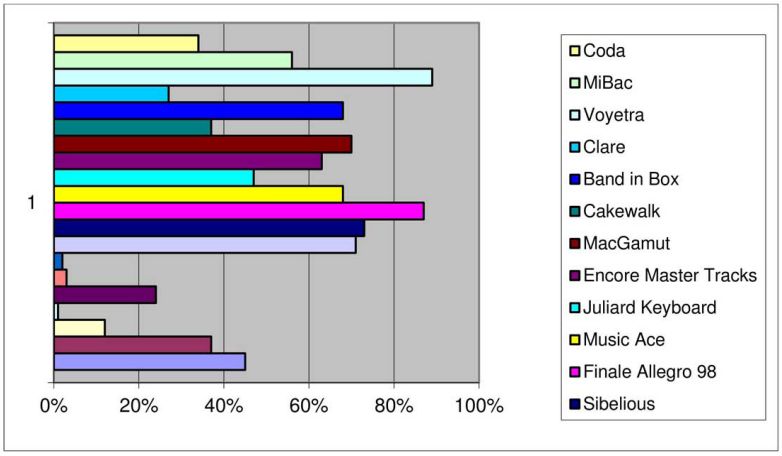
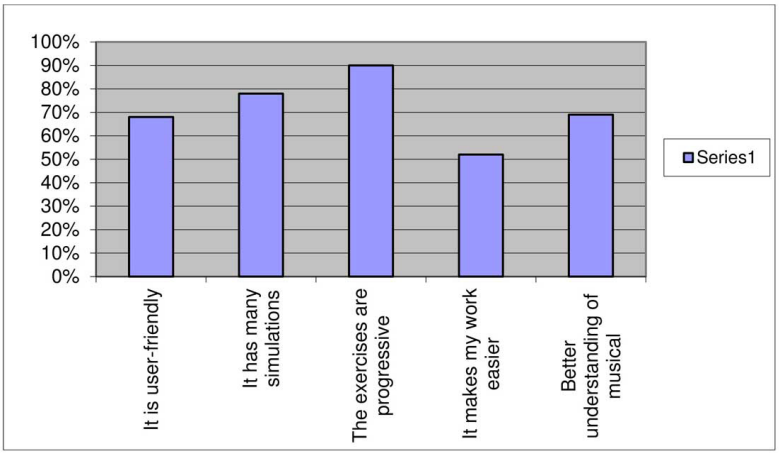


Table 6. Reasons for using this particular (Voyetra) software



Discussion

Although the evidence on the most effective music software in the teaching of music is still incomplete, it is important that we take account of these characteristics now, rather than waiting for further data collections to provide additional detail. Technology, despite being an integral part of the 21st century music pedagogy as claimed by some advocates, is still an ongoing trend with both cons and pros. In this research, previous web experience and use of e-mail were the only two experiential variables that distinguished between teachers who are proficient with technology and those who are not. It seems meaningful to conclude that teachers enrolling in web-based courses are more proficient in CAI and therefore more comfortable with the music courseware in the classroom than those who are without the web-based course experience. Table 1 show that the mean age of the technology users is 30.9 which indicates that the users if technology are relatively younger. However, Table 2 shows that all the at least 40% of teachers use some for form of technology in the classroom. In Table 3 we can see that there is a great significance of teachers using technology in the classroom in order under the Motivational Model ($p<.001$). For some of those online students (59.5%), web experience was accumulated in previous online courses. Thus, experience itself could be viewed as an important motivator for subsequent use if CAI in the classroom teaching.

Four out of forty educational music software sampled were distinguished among the Techno-Teachers. This result was consistent existing literature which suggests that the most effective courseware is not necessarily that which provides the most prevalent form of thinking, but rather a reasoning where both the teacher and the learner are capable of using it to become highly conscious, directed, controlled, active, purposive, intentional, forward looking and forward going, and goal-oriented. It starts with a well formulated problem and continues until a solution is achieved with (Hall, 1960, Johnson & Barker, 2002). Table 5 suggests that both Voyetra and MacGamut consist of the characteristics that foster a student-centered learning while providing teacher user-friendliness with 90% of respondents indicating that Voyetra exercises were progressive (See Table 6). Perhaps, in the current “high-tech” milieu the use of CAI in the teaching of music is really seen as easier and therefore appealing to those with fewer pedagogical approaches as well as students with lower learning motivation. Consistent with this interpretation is the demographic observation that teachers using CAI are likely to have a previous technological experience (60%). On the other hand, another explanation could be linked to the motivational model. A more fine-grained analysis of motivation is warranted with respect to CAI perhaps with looking at multiple intelligences, attribution theory, social learning theory, and personality variables. Such an inclusive analysis could present a fuller understanding of the Demographic, Experiential, Motivational; and the Inhibitory models.

Conclusions and recommendations

Software Evaluation is a very important aspect in the selection of educational software and this concept cannot be overemphasized. This task is not always simple as there several overlaps. Several researchers have classified educational software differently; some basic concepts of the software are commonly found in all the software (Maffei, 1986; Dunlosky, Rawson, Marsh, Nathan, & Willingham, 2013). While Brock (1994) has classified the software into four groups, Maffei (1986) puts them into five categories: (a) drill and practice, (b) tutorial, (c) simulation, and (d) problem solving. Maffei (1986) goes further to include (e) classroom management (p. 42). More taxonomies are needed to discern the best way forward in categorizing effective software for teaching music.

An effective software in music education was found to be a tutorial software, covering a specific subject as well as cumulative; as that kept the learners focused and developed more interest in the learning. The motivation come from cumulative game scores, which they were able to see immediately on the screen - and from the fact that they were on their own, without the sense that someone was impatiently waiting for the correct answer (Nesse, 1997). According to Maffei (1986), “Tutorials are especially useful in the classroom situations that are unable to meet the learning needs of specific types of students (p. 40). With this kind of software, the learner can review the learning material repeatedly until he has completely comprehended the content. This is not usually practical during the regular class room teaching. Skinner’s classical conditioning theory comes in handy in reference to the repeated actions and the way redundancy promotes the learning process.

Checking Answers as a component of providing feedback to the learner is essential for any effective music software. This is supported by the theories advanced by psychologist Skinner on his study on the Stimulus (S) and response (R) in learning. It is likely that checking answers using an educational software (Nesse,1997) will motivate learning, hence teachers are encouraged to use this approach. A good software needs to have a device whereby the learner can check for answers by clicking on the check button to evaluate the answer. The learner’s score needs to be updated on the window. According to Nesse (1997) symbols should appear above the Answer Boxes and be used to indicate right and wrong answers. This kind of software provides the learner with the opportunity to grasp the meaning of statements which are clearly defined thereby enabling him to apply the traditional model of critical thinking, (Ennis, 1987). It is usually more rewarding to think the three broad categories of objectives by Bloom as Wellington (1999) examined the study of the three, (a) cognitive, (b) affective and (c) the psychomotor domains. When this taxonomy has been applied in the use of technology in teaching programs, it yields excellent results.

Effective software needs to be suitable for a wide range of users - from grade-school students up through university. Its transferability fosters student independence allows for adjustability of the lessons to levels of difficulty, allowing each student to learn at their own pace as either beginners or advanced learners is also possible (Nesse,1997) to. A good software for teaching music (Nesse,1997) needs to have appropriate interface which is clear and easy to use, and encourages the learner to move ahead at his own pace. The

software needs to be simulative as the use of simulations in the classroom (Maffei, 1986), provides students with an opportunity to learn when the real experience is impractical (p. 40). The software also should enable the learner to switch from one topic to the next with ease.

It should have in its setting, very well summarized notes on the essential topics required of every music student at college level. Coupled with manipulative teaching techniques and feed back to the learner, it should be mostly appropriate and ideal in the classroom. The use of technology in the world of music today is an inescapable fact. Any musical composition that we hear goes through a technological process at some point. This can be when the piece of music is created, when it is played or when it is reproduced. Thanks to the use of technology, musical information and communication have increased in scope over the past few decades to a remarkable extent.

The use of technology and other resources in music education does not only awaken the students' interest in learning; it also prepares them for integration into the increasingly technological society in which they live. The role of music education in primary and secondary schools is to educate future listeners of music and arouse an appreciation of music. Throughout their educational careers, students should learn to listen to music (develop their musical awareness through listening and analyzing music as well as expressing themselves by playing and composing music).

Technology is a tool for developing these skills. The new instruments and techniques it provides are inherent to the use of computers. Using these resources brings about change in the learning process and a more active and flexible education. The students learn in a more informal and pleasurable way as they discover and acquire knowledge of music and their exercise their critical and aesthetic thinking.

Effective software in music education should contain elements of cognitive reasoning which should entail problem solving strategies. There are many kinds of problem solving. The researcher tends to think that an effective software should be what Hall (1960) puts as not necessarily providing the most prevalent form of thinking, but rather a reasoning where the learner is capable of being highly conscious, directed, controlled, active, purposive, intentional, forward looking and forward going, and goal-oriented. It starts with a well formulated problem and continues until a solution is achieved. It seems logical therefore that drill and practice software Maffei (1986) would be the main type of software used in the classroom. However, it should not be the only type of software used (p.40)

William and Paprock (1999) on Distance Learning highlighted on the necessary components that software in music should have. They both enumerated the constituent of effective software in music by emphasizing clearly the significance of considering the content of the educational objectives in a courseware. Educational software can be tremendously valuable in reinforcing lessons learned in the studio and adding interest to practice and finger training. Different packages emphasize different aspects of the learning process and employ different methods, so no single package, no matter how good, is right for all students. It is recommended that an educator check with the other practitioners to make sure that the package one is considering will interact positively with personal goals (Cruz, Wieland, & Ziegler, 2006).

Effective software in music education needs to have consistency and several elements that add up to a single goal. There ought to be frequent updates for instance in the use of musical excerpts, music is chosen around a certain unifying principle Listening Focus) to exemplify certain elements of music: period, style, composer, and thematic material (Krout, 1987). According to a Massachusetts Music commission's report made in 1997 to the President of the Massachusetts Institute of Technology on the Use of Technology to Strengthen K-12 Education in the United States, the observation manifested itself in the outcome of the standard tests. The authors asserted in part that in order to effectively integrate new technologies into the curriculum, teachers had to select appropriate software, construct new lesson plans, resolve a number of logistical problems, and develop appropriate methods of assessing student work.

Effective music teaching, curriculum development, the selection of appropriate teaching software, and presentation in music education are fundamental issues affecting the 21st century classroom practices. Technological literacy for students is a prime concern of the U.S. Government (U.S. Department of Education, 2010). As result, the 21st - century curriculum should also embrace technology, especially music education software which contain elements of cognitive reasoning and entail problem solving strategies. Future studies are needed to explore implications of integrating current and future technology advancements in music curriculum, notably, strategies for incorporating mobile technologies and emerging web technologies for music education.

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