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Increasing the Understanding of Music Theory by Using Technology for Kuwaiti Undergraduate

Dr. Haya Eshaq

Music Department, the College of Basic Education

Abstract

Advancement in technology offers multiple learning resources that teachers can utilize to enhance learning in the classroom environment as well as in students' personal practice. Music theory learning provides several challenges to students due to its perceived complexity and tediousness. This research aimed to explore how embracing technology can deepen students' understanding of concepts of music theory. The role of teachers in applying technology in teaching music theory was emphasized. This is a mixed methods study utilizing primary data and data from previously completed studies in the College of Basic Education for undergraduate Kuwaiti students who learn music theory in the Music department in Kuwait. A treatment and control group were used, both groups consisting of eleven students each, with the treatment involving teaching music theory using websites for level one. Previous studies were also explored for purposes of exploring findings for the research with others in related topics. The results point to the various benefits of applying technology in teaching music and the superiority of technology-based modern methods over the traditional textbook and notebook methods. The need for identification of student strengths and weaknesses emerged as a critical point in extending their understanding of music theory. Recommendations are also provided to enhance the findings of this research further.

Key Words: Music theory, Kuwaiti undergraduate, Technology

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CHAPTER 1: INTRODUCTION

The Music Department of the College of Basic Education located in Al- Ardeya area focuses on advancing student's knowledge with regard to learning of music theory. The dynamism of contemporary music theory learning demands a deeper understanding of the concepts of music theory through multiple learning techniques. Currently the institution utilizes traditional music theory learning techniques of textbook and class notes. Although the method is proven to advance students' knowledge of music theory. Advancement in technology avails new internet based methods that are likely to make music theory learning for undergraduate Kuwaiti students more effective (Kim, 2013). An assessment of the utilization of music theory websites and their effectiveness will inform decisions to fully embrace technology in teaching music theory to undergraduate Kuwaiti students.

The constituent elements of music are continually expanding hence the conception of music theory must similarly increase to include other sonic phenomena. Music theory is constantly used in reference to the practices and related activities to music (Taele, Barreto & Hammond, 2015). Musicians and composers create music with a focus on key elements such as sound pitches, harmony, the method of composition, tunes among others. Technological advancements in the recent past are transforming the way students and teachers approach the critical concepts of music theory (Ruthmann, Tobias, Randles & Thibeault, 2015). Traditional methods of studying music theory mainly involve the reading and analysis of book content to improve the understanding of the elements of music. This method slightly defers with the more technologically conscious modern techniques that utilize websites, i-notes, and other technology-based methods. The consensus is that music theory creates a deeper understanding of the elements of music. However, Kuwaiti Music Department undergraduate students may occasionally find studying music theory tedious if not done correctly or when carried out using the wrong principles. Under such a situation, the utilization of technology in studying music theory provides opportunities for more involving and entertaining approaches. Additionally, some of the challenges associated with the

traditional methods of studying music theory are eliminated with a more involving and simpler approach.

Technology is continuously evolving towards faster and easier methods of sharing information across the world. Technological advancement comes with easier access to techniques for solving problems encountered in the learning environment. Technology-mediated learning of music theory is potentially beneficial to learners especially in situations of varying strengths and weaknesses of the learners (Kim, 2013). The concept of socio-educational trends in teaching is quickly gathering popularity albeit with the associated benefits. Postmodern techniques in teaching music theory together with IT advocate for new approaches that are a representation of the trends in music theory pedagogy (Garnett, 2013). From the students' perspective, music theory learning is sometimes tedious due to the practical oriented nature of music practice (Russell-Bowie, 2013). Such attitudes limit the grasp of various aspects that are critical in deepening the understanding of music theory. Traditional methods of teaching are not likely to improve attitudes and make music theory teaching more entertaining for students. In light of that, a more integrated approach is necessary to improve student perspectives and identify specific areas where emphasis is needed (Kim, 2013).

Objectives formulated for this study are inclined towards the application of technology in easing students' understanding of music theory. Music theory sites provide useful learning resources that when fully utilized will not only improve results but also create positive attitudes among students. The main objective for this research is to determine the impact of technology on Kuwaiti undergraduate students performance in teaching music theory. Supporting objectives include:

1. To determine Kuwaiti music undergraduate students' response to technology especially when using music theory sites in learning.
2. To compare the effectiveness of technology conscious practices in comparison to traditional methods of teaching music theory to Kuwaiti undergraduate students.

3. To determine the relevance of music theory sites in practicing sound pitches, harmony, and rhythms.

CHAPTER 2: LITERATURE REVIEW

Trends in Learning Music Theory

Adoption of technology in teaching and learning is now a growing trend worldwide. The education potential of technology especially in relation to teaching practices provides evidence for a more technology oriented teaching techniques (Price & Kirkwood, 2014). However, this does not imply that traditional techniques of teaching music theory are obsolete. On the contrary, the modern trends advocate for a re-enactment of the traditional activities into media that are more entertaining or attractive to students. Different studies point to varying levels of success with technology in student teaching (Price & Kirkwood, 2014; Kim, 2013). A shift from the traditional methods of studying music theory to the modern technologically inclined methods should be backed by evidence on student outcomes. Evidence, in this case, is not limited to the class grades but also includes the attitudes and perspectives of students towards the new methods (Russell-Bowie, 2013). Importantly, a positive attitude towards music theory and the overall improvement in the approach to music theory are key markers for change in students' perceptions (Russell-Bowie, 2013). Capitalization on these modern techniques requires informed decision making by teachers in the context of the best practices for a group of students.

Techniques in Teaching Music Theory

Several evidence-based practices have been developed to instruct students in musictheory. Some of the most notable techniques are grading based on evidence, just-i-time teaching and the inverted class (Duker, Gawboy, Hughes & Shaffer, 2015). Standard-based grading relies on multiple grading systems that are based on the objectives and goals of the course. As opposed to the single grading system, different grades are awarded according to the various course objectives as opposed to single grade which averages the strengths and weaknesses of the student. The strength of this

method lies in the wealth of data that the teacher and students have access to base on the objectives of the course. An inverted classroom revolves around the idea of knowledge acquisition through personal effort the classroom experience (Bishop & Verleger, 2013). The classroom experience serves to deepen the student's understanding of various concepts that they already have knowledge off through personal reading and research. A flipped classroom works better with digital technology through easier content delivery and assessment of students' comprehension (Roehl, Reddy & Shannon, 2013). The innovative nature of the inverted classroom has facilitated its use for decades since the period of more traditional and rigid techniques (Duker, Gawboy, Hughes & Shaffer, 2015).

On the downside, the inverted classroom technique does not guarantee adequate preparation for the classroom by all students. In such cases, key aspects of music theory can be easily be missed due to limitations in understanding during classroom teaching (Roehl, Reddy & Shannon, 2013). Ideally, the inverted pedagogy is not a stand-alone technique but rather works best with the just-in-time teaching method (Bishop & Verleger, 2013). Often students may loathe going through content before class hence affect the outcome of the class (Russell-Bowie, 2013). Just-in-time techniques require teachers to prepare tasks between classes and ask students to go through learning materials before answering quizzes. The quizzes are the benchmark that will help the teacher to identify the most problematic areas for the students (Ramezani & Razmeh, 2014).Consequently, they prepare their classroom to emphasize the areas of weakness. Just-in-time techniques allow students' access to the most recently developed content in music theory (Duker, Gawboy, Hughes & Shaffer, 2015). The three teaching techniques are not entirely new to teaching music theory but rather utilize the traditionally developed methods in the modern context (Ramezani & Razmeh, 2014).

Aspects of Music Theory Pedagogy

The challenges encountered by students in learning music theory can be eased by making the process more active, aural and creative (Callahan, 2015). Music theory

pedagogy asserts that creative learning has the best outcomes, especially in a more digital environment (Garnett, 2013). Technological advancement puts at the disposal of teachers numerous resources for teaching music theory (Eady & Lockyer, 2013). Incorporation of the keyboard, vocal and sing exercises into analytical tasks of music theory makes the process more entertaining and involving. The challenge that most music students experience is the lack of skills to play instruments like the piano (Nijs & Leman, 2014). Thus, teachers incorporate such lessons in music theory learning for the student to understand the different elements of music. However, this poses the extra challenge of guidance, especially in a large class. Since it is almost impossible to give specialized attention to all the students in such classes, assignment of tasks allows the students to independently improve their skills (Pun, 2013). Lack of regular and detailed feedback which has the potential to massively derail the morale of learners is solved through the assignments although the instructor has to invest a lot of time into the process. In the long-run, the abilities of the students in learning music theory improve through overcoming the individual challenges identified through the developed instructional techniques (Ruthmann, Tobias, Randles & Thibeault, 2015).

The imperative for music theory teaching improvement is evident in the need for continuous growth in confidence as the student advances his/her knowledge. Building confidence has the potential to transform underperforming learners into a standout performer in music (Bernhard, 2013). The kind of techniques adopted by the teachers plays a critical role in confidence improvement and eventually development of skills (Callahan, 2015). Traditional methods of the teaching music theory have a much lower impact in the confidence of the learner when compared to the modern and more technologically conscious methods (Dorfman, 2013). Confidence increases with the application of the right techniques for studying music theory so do the abilities of the students to play instruments (Bernhard, 2013). Furthermore, perceptions about music theory and the approach to concepts experience improvisation when the learning techniques are more involving. These findings underline the need for teachers to

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develop teaching techniques for music theory that are oriented towards the needs of students (Dorfman, 2013).

Alternatively, teaching supervision in music theory training provides opportunities for student improvement. Traditional tools for teaching supervision are still applicable today although social development and improvement in internet technologies spell transformations in the approaches (Parshina, 2014). Developing a uniform system that integrates the tools of assessment is almost impossible; hence, various tools can be used in active combination with each other to reach desirable results (Kulakli, & Mahony, 2014). Efficiency in supervision while teaching music theory is not necessarily based on the adopted method of assessing students' performances but rather the ability of the teacher to identify the strengths and weaknesses of the students. As such, it is easier to create improvements by concentrating on the specific areas of student learning (Bernhard, 2013).

CHAPTER 3: METHODOLOGY

The research methodology explains the rationale for the research, the strategies used in conducting research, the design, and methods for data collection in assessing the relevance of technology in teaching music theory to Kuwaiti undergraduate students. The instruments used for data collection and their relevance and applicability to the data collected are discussed. The research questions which informed the study are also presented. A systematic approach to how the research was conducted presents key aspects of the research hence provides a guideline for the overall outlook of the study. This mixed method research sought to capitalize on the strengths of both qualitative and quantitative methods. Comparison provides the basis for identification of gaps that this research can fill (Creswell & Clark, 2017). Previous studies on the use of technology in teaching music theory highlight the need for interactive processes (Dorfman, 2013; Fitzpatrick, 2014). Additionally, the expected challenges in this research are better approached with knowledge of the setbacks that previous researchers encountered.

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Rationale for the Research

Previous studies have sought to explore the importance of technology in teaching music theory without considering the comparative analysis of traditional methods versus modern technology-based methods (Russell-Bowie, 2013). While findings point to increased use of technology in deepening students' understanding of music theory, there has been very little focus specifics like music theory websites and how they impact on student perspectives and performance. While a wholesome approach to improve music theory learning through technology is plausible, specific methods of achieving these results are necessary to eliminate confusion and inconveniences among different sets of students. Additionally, students encounter various challenges according to their abilities and level of understanding of elements of music theory. The problems are worse when the traditional methods of teaching are applied. Therefore, to mitigate these problems and achieve an overall improvement in the performance of students in classroom settings, the capitalization of the various aspects of technology is a necessity. Music theory websites offer a unique experience that is unmatched by traditional practices as well as other technology-based methods.

The grades for music department students at the college who took music theory classes in level one will be used as indicators of the impact of the two methods of teaching music theory; traditional methods and technology-based methods, facilitates comparison and drawing of conclusions based on analyzed evidence. As earlier stated, there is no single uniform technique for carrying out supervision in classroom settings. Supervision and identification of students' strengths and weakness must be based on measurable concepts that clearly outline the areas that the student needs to focus on to create improvement. In this case, student grades serve the purpose of providing measuring outcomes that are the evidence for the impact of the two methods. A conceptual approach to the topic under study requires comparison with previous research findings on the impact of technology-based practices in teaching music theory. Comparison with previous studies aids in determining trends as well as the level of expected impact that the study findings will have when fully

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implemented. In essence, it helps in providing a basis for substantive arguments in relations to research findings.

Research Questions

Research questions are a guiding framework for the researcher while conducting the study. The researcher seeks to answer the specific research questions as they collect data, performs analysis and draws conclusions about the research. The questions are derived from the doubts or the main intent of the research. The topic or research is the main source of the research topic and a guide for formulating the research questions. The questions are characteristically precise but arguable and form the basis for the research. At the end of the study, the research questions are fully answered in order to achieve the purpose of the study. This research will be guided by the following questions.

- How does the use of technology in learning music theory impact on the undergraduate students understanding?
- Does technology improve student interest in the different elements of music, more specifically the Kuwaiti students learning music theory?
- What particular aspects of technology in learning are applicable to improving the students' understanding of music theory?
- Which challenges do Kuwaiti undergraduate students face when applying technology to learning music theory? How are the challenges overcome?

Research Strategy

This study will utilize several aspects of pedagogy theories that are influential in determining student outcomes in relation to the teaching strategies applied. Enterprise pedagogy in music is among the most pervasive methods of teaching music with a focus on student outcomes. Enterprise pedagogy applied in music differs from a similar type of learning that is applied in entrepreneurship in the context that it is concerned with personal skills, behaviors, and attributes that contribute the success of the student while learning music (Garnett, 2013). An enterprising individual displays

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the characteristics of autonomy, affinity for achievement, innovativeness, and creativity. These characteristics are critical in defining a music-oriented person and can as well be applied to the development of skills related to music theory. More specifically, the teacher develops work schemes that demand students to deliver specified music outcomes that are then assessed for various aspects of its intended outcome. Briefs to students serve as guidelines that then inform decisions on the manner of undertaking their tasks. Collaborative processes are crucial in the effective completion of these tasks but the distinct contribution of each student are mapped to identify critical areas of their skills. Music theory teaching by applying the skills of enterprise pedagogy can effectively transform the attitudes and perceptions of the students towards a more outcome-oriented end. As such, the student embraces the influence of music theory in the overall development of music knowledge.

Emphasis on innovative strategies in teaching music theory is a critical area of focus in this study. While the main purpose of teaching music theory is to increase students' understanding of multiple concepts relating to music, achieving this purpose is nor a straightforward affair. As earlier stated, the challenge of tediousness in teaching theory to practically oriented students is often forthcoming and potentially limits the level of grasp of content if not properly addressed. Innovative methods of presenting various concepts to the students are viable in the quest of making the process more involving and entertaining. Innovativeness in teaching music theory deviates from the traditional textbook and notebook format and adopts a more outcome-oriented pattern involving the setting of specific objectives for the students. The objectives are a breakdown of the intended outcomes of the learning process. Technology promises better access to information through websites that also present facts in more entertaining and involving formats than traditional textbooks. Therefore, this research aims to identify the innovative areas the teacher can apply in conjunction with technology to improve learning experiences. While focusing on more involving practices, specificity of needs for students is a crucial consideration.

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Research Design

This experimental research uses two groups of students enrolled at the College of Basic Education in Kuwait who are studying in the Music Department in Al- Ardeya area to collect the necessary data for purposes of analysis. The experimental group in this study undergoes music theory learning using technology, more specifically learning using music theory through the website www.teoria.com. The control group, on the other hand, is taught music theory using traditional techniques of textbook and notebook. This a post-test only design where no testing is carried out before the commencement of the research. The experimental group receives the treatment while the post-test is carried out on both groups to determine the effect that the manipulation has on the experimental group (CIRT, 2018) In this case, the form of manipulation is the music theory learning by applying technology. The effects of the manipulation are tested on the independent and the dependent variables.

The dependent variable is the grades achieved by the students in the class after music theory learning. This variable determines the exact effect that the treatment has on the experimental group. Therefore, the range of the positive or negative average change in group mean in comparison with the control group informs the level of influence that the treatment has on the dependent variable. The independent variables are the content that the teacher intends to pass to the students. It may include the various elements of music theory learning and the intended gains that the lessons have on the students.

Data Collection

Primary data for this research was obtained from the student outcomes assessments in the form of grades attained in class. These are the grades for the class tests achieved by each student in the process of undergoing music theory learning and at the end of the predetermined period. The students underwent similar tests in both the experimental group and the control group. Key areas of focus were tone, rhythms, pitches, scales, intervals, and composing. The similarity in tests is aimed at ensuring a complete comparison of results in each group. The secondary data for the study was obtained from previous studies comparing traditional methods of teaching music

theory and technologically conscious methods. The data is from peer-reviewed sources to ascertain reliability and authenticity. The data is majorly statistical to ensure an easier comparison of values.

Data Analysis

The primary data for the study will be analyzed using the common methods of statistical data analysis; the mean and the standard deviation. The mean provides a rapid overview of the trends in the two groups under testing. The standard deviation will then determine the way the data is spread around the mean. Implying that a greater deviation signifies a large spread around the mean. Since only the data obtained from the two groups is not adequate to make conclusive decisions about the superiority of the two music theory learning methods, secondary data provides a viable option for making informed decisions on the topic. An evaluation method for the data will be adopted where the trends from previous studies will be key areas of focus.

CHAPTER 4: PRESENTATION OF DATA AND ANALYSIS

The data collected for the research is presented in a clear format in this chapter. This includes the primary data for the student grades after testing in the music theory class. The secondary data from peer-reviewed sources is also put forward for analysis. The analysis section aims to attach meaning to the raw data by applying statistical tools and analysis concepts. The analysis will be based on evidence from the data as opposed to predetermined ideas and concepts. A comprehensive presentation of results is done to ensure useful conclusions are drawn according to the objectives of the research. The analysis also assists in answering the formulated research questions.

Student Grades in the Two Control Groups

Grades obtained by the two groups after music theory learning are presented. Each group consisted of eleven students whose performance was monitored and the grades recorded. Since music theory teachers have a responsibility to improve student

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performance, testing is a viable method for determining the success of the students in understanding the concepts of music theory.

Experimental Group

Student	A	B	C	D	E	F	G	H	I	J	K
Grade	84	78	52	76	76	69	90	88	77	50	81

Control Group

Student	M	N	O	P	Q	R	S	T	U	V	W
Grade	90	87	56	59	42	65	63	71	84	51	60

Analysis

Experimental Group

Calculating the mean for the experimental group provides an overview of the overall performance. It however does not provide a complete picture of the performance of the whole group hence the standard deviation is required to determine the distribution from the central value which is the mean. In essence, it helps in determining discrepancies in performance within the group.

The mean which is the simple average for the group is $\mu=\frac{\sum x}{n}$= 821/11=74.64

Student (n=11)	A	B	C	D	E	F	G	H	I	J	K
Grade (x)	84	78	52	76	76	69	90	88	77	50	81
$(x- \mu)^2$	87.61	11.29	512.57	0.41	0.41	31.81	235.93	178.49	5.57	607.13	40.45

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$$\sigma = \sqrt{\frac{1}{N}\sum_{i=1}^{N}(x_i - \mu)^2}$$

$\sigma_1 = 12.47$

The experimental group scored highly in the tests administered by the teacher. The lowest scoring student scored 50 marks out of a possible 100 while the highest scoring student scored 90 marks. There is a large gap between the highest and lowest scoring student although this disparity could have been precipitated by various factors apart from the teaching method applied. The mean grade for the experimental group is 74.74, way above the average grade of 50. This implies that the students have a fairly good grasp of the concepts of music theory.

Control Group

Similarly, the mean for the control group is calculated

$\mu_1 = \frac{\sum x}{n} = 66.18$

Student	M	SN	O	P	Q	R	S	T	U	V	W
Grade	90	87	56	59	42	65	63	71	84	51	60
$(x-\mu)^2$	567.39	120.82	103.63	51.55	584.67	1.39	10.11	23.23	317.55	230.43	38.19

$$\sigma = \sqrt{\frac{1}{N}\sum_{i=1}^{N}(x_i - \mu)^2}$$

$\sigma_2 = 13.63$

The highest scoring student managed a grade of 48 while the highest scoring student achieved 90 marks. Similar to the experimental group, the gap between the highest and lowest marks is enormous. The mean mark of 66.18 is above the average but lower than that for the experimental group.

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Secondary Data

Secondary data collected from the peer-reviewed sources aimed at comparisons with the primary data from the classroom. It also seeks to validate the findings from the analysis of the class grades in teaching music theory.

In the first study, different groups of students were classified into treatment and experimental groups. The experimental groups were then tested for various aspects of music theory such as tone, rhythm, and composition by applying an interactive method of testing for teaching music theory (Nijs & Leman, 2014). In the end, the groups were tested for their abilities in the aforementioned elements of music theory. The standard deviations for the groups were then calculated.

Table 7
Mean and standard deviations of the post-test. Because results of the PMMA and IMMA cannot be compared, scores are differentiated.

	Tonal		Rhythmic		Composite	
	M	SD	M	SD	M	SD
CGr – IMMA	95.33	5.43	70.00	33.02	83.17	26.44
GrA	96.33	2.31	63.33	50.58	74.67	38.70
GrB	94.33	8.08	76.67	5.77	91.67	5.77
TGr – PMMA	56.33	33.95	50.67	19.01	45.33	26.08
TGr – IMMA	99.00	.00	76.67	23.63	91.67	10.12
GrC – PMMA	59.50	47.38	60.00	14.14	48.50	36.06
GrC – IMMA	99.00	–	95.00	–	98.00	–
GrD – PMMA	50.00	–	32.00	–	39.00	–
GrD – IMMA	99.00	.00	67.50	24.75	88.50	12.02

Fitzpatrick (2014) noted that web-based technologies in the form of interactive blogs can mediate music theory learning even within a short period. He then sought to prove his statement using a group of nine students (n=9) taking part in a music seminar. The students were taken through various aspects of music teaching experiences to determine the level of involvement and interest when using the web-based methods. The researcher identified that the students' degree of concentration and interest in the various topics presented was unusually high when these methods were applied. The interactive methods were preferred over the other methods of learning during the seminar.

In another study to determine the potential of using YouTube in teaching performing arts, both the opinions of experts and students were sought (DeWitt et al. 2013). The experts included lecturers and instructors with various levels of specialization. A

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triangular Fuzzy Number was then used to produce a negative scale such that a scale of 5 implied that the respondents strongly agreed (0.6, 0.8, 1.00) and (0.1, 0.2, and 0.4) for strong disagreement. The study used several questions to determine the response of experts and students with each giving their opinions on various issues relating to the research topic. The researcher then applied a triangular Fuzzy Numbers to rate the answers and draw conclusions as follows.

Table 2: Student interest and achievement using Youtube for teaching and learning

Position	Question	Deffuzification Marks
1.	Face-to-face teaching methods is more relevant compared to using YouTube for instruction	13.8
2.	Youtube can be used as a platform for the promotion of performing arts among students.	12.9
3.	Visual elements are displayed through Youtube to attract the attention and interest of students	12.5
4.	Teaching and learning the performing arts is more efficient if coupled with Youtube applications	11.75
5.	Effectiveness in terms of student achievement cannot be measured using Youtube applications	11.5
6.	The use of Youtube in the teaching and learning of the performing arts can create two-way communication between lecturers and students	11.1
7.	Negative issues such as copyright of the work of performing arts will affect teaching and learning using Youtube	9.7
8.	Learning through the use of Youtube is less effective in terms of student motivation and achievement	9.2

CHAPTER 5: FINDINGS AND DISCUSSION

The discussions of findings sections attach meaning to the analyzed data in the previous section. It conclusively used the findings to answer the research questions and meet the objectives of the research. This section ties evidence to theory in understanding the way the use of technology in teaching music theory will impact on the performance of the students. Using the secondary data from previous studies, comparisons are drawn between the findings from the raw classroom data and other previous research. Clarity and precision in the manner of approach to the analysis of data and interpretation of results in the key purpose of this section. The section also

convinces the reader on the multiple aspects of technology use in improving student performance in teaching music theory.

Students Performance in the Experimental Group

The performance of the experimental group is an indicator of the positives gained in using music theory websites to teach students. A sizeable number of students achieved grades that were way above the average grade of 50. Although several contributing factors may have had a role in the excellent performance, the technology-based practices certainly impacted on the grades. The grades highlight the importance of technology in teaching music theory in the modern context. The mean grade for the experimental group adds a claim to the relevance of technology in modern practices of teaching music theory. Considering that the group achieved an excellent mean, it is prudent to adopt modern practices of teaching music theory to include the use of music theory sites. The sites offer the benefit of a more involving approach and specific assessment of the abilities and potentials of the students. It is easier to identify the weak areas of the students when tasks are provided and assessments are done using technology conscious means.

The standard deviation measures the spread of data from the mean value. A larger standard deviation implies a greater spread from the mean value. In this situation, a greater deviation is undesirable since it signifies large differences in marks between the students. A marginal value of SD is more welcomed since it implies a closer level of understanding of musical theory concepts. The SD of 12.47 obtained for the experimental group is a little higher than the ideal value although it does raise concerns given the various factors that contribute to student grades. However, with better implementation of technology in teaching music theory, the areas that result in poor grades for students are identified and corrective measures applied to bridge the gap between the bests and average performing students. The SD also facilitates a better understanding of the student needs by the teacher. Trends in the standard deviation as the techniques are applied in teaching music theory informs the impact that the practice has on the students understanding of concepts.

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Students Performance in the Control Group

Performance in the control group had the highest disparities although the obtained mean value of 68.18 indicates an above average grasp of key concepts of music theory. The purpose of the control group in this study is to provide the basis of comparison with the treatment group. From an independent perspective, the traditional teaching techniques applied to this group had a negative impact on the performance of the students in the control group. The SD deviation in the group was extremely large signifying a large difference in the understanding of concepts of music theory within the same group. Additionally, the lowest scoring student had a mark that is below average hence the teaching techniques applied are not favorable for all the students. It could also imply a lack of interest on the part of the student.

Comparison between the Control and Experimental Group

The comparison provides a basis for either the adoption or rejection of the treatment applied to the treatment group. Adoption is only possible if the treatment promises better results than the original method. A stronger control group provides the basis for drawing more confident conclusions as compared to a weaker one or its absence at all (Bredeschool, n.d). The control group in this study is certainly strong since it offers almost similar characteristics in terms of cognitive abilities and talents as the experimental group. Therefore, the conclusions drawn are bound to be valid in the context of the study. Comparison between the mean obtained for the two groups indicates better performance for the experimental group. The differences highlight the benefits that technology-based learning of music theory presents over the traditional methods. Designing technology to enhance learning is a critical step in enhancing student performance as evidenced by the grades obtained by the students (Kirkwood & Price, 2014). Practices such as issuing assignments that the tutor is able to assess before classroom lessons ensure that the tutor strongly connects with the needs of the students and is able to plan schedules according to these needs. The websites are crucial platforms for students to enhance their knowledge of concepts of music theory and learn how they relate to the practical aspects of music. Formulating a direct relation between the concepts of music theory and their influence on the performed

elements of music is much easier when done using illustrations and videos than when explained in textbooks. Hence, students have an easier grasp of the concepts when music theory websites are used in learning.

Again, the SD between the two groups adds a claim to the superiority of technology-based methods of teaching music theory. The control group had a greater SD compared to the experimental group. Implying that disparities in the conceptualization of the music theory in the control groups were higher than in the experimental group. A tutor focuses to achieve an almost similar level of grasp of concepts between students in any given classroom. A smaller SD deviation in students taught using music theory websites provides evidence to the benefits that technology offers in learning. Ideally, it is easier for the teacher to provide personal attention to students when technology is applied. The population size serves a key role considering this critical aspect. The population size for both groups is small enough to ensure that the teacher does not lose track of the student needs. While the population size is ideal for both groups, the process is easier for the experimental group since the result can be assessed outside classroom settings.

In the study to determine the effect of interactive technologies in teaching music in the classroom, the grades of the control and treatment groups were recorded over a nine-month period (Nijs & Leman, 2014). Similar to the primary data obtained for the Kuwaiti students, the students who were subjected to computer technologies in teaching music recorded slightly higher results than their counterparts in the control groups. Higher SD deviation was obtained for the control groups as compared to the treatment groups. This was consistent in all the music aspects of tone, rhythm, and composition that were tested in the classroom. Implying that interactive technologies played a key role in achieving these differences. Technology-enhanced instructional techniques have superior outcomes in teaching music theory to students. This is similar to the assertions of Dorfman (2013) that students benefit more from direct interaction with technology when learning music. Reflective attitudes also improve

with interactive technologies of teaching music as the students gain interest in new ideas and concepts that they had not been previously exposed to in the course of learning. The teacher also begins to reflect on new ideas of imparting music theory knowledge to students hence improving the classroom experience by eliminating boredom.

Web-based technologies mediate music theory learning within a short period (Fitzpatrick, 2014). Aside from the long-term benefits of technology in learning, the benefits can also be achieved within a short period. Students are now more knowledgeable about matters of technology can easily relate to the techniques applied in teaching music theory if technology-based methods are used (Kruse, Harlos, Callahan & Herring, 2013). They are better placed to identify with key concepts due to the manner that they are presented in the in the music theory websites. Again, due to the tedious nature of learning music theory, technology can help to enhance deeper understanding through tests and quizzes that assess their strengths and weaknesses. Consequently, within a short period attitude change as well as improvement of results. Individual opinions and perspective are also critical to the success of any adopted method of teaching music theory. A survey of experts and students on the role of videos in teaching music enhanced the findings of this research on the use of music theory websites (DeWitt et al. 2013). The response by both groups not only highlighted the importance of technology in teaching music but also reflected the modern trends on how stakeholders view the role of technology. Technology is an indispensable tool in achieving a deeper understanding of music theory for learners. Although expert has their reservations about certain issues such as plagiarism and authenticity, there is a consensus with students that the benefits that technology offers in learning music theory cannot be ignored.

Expectedly, several challenges are encountered by students in the course of learning music theory, both in traditional and modern contexts. Overcoming these challenges is critical in achieving deeper meaning to music theory. Music theory learning

through sites promises a better avenue for overcoming these challenges when compared to traditional practices. As stated earlier, technology offers the advantage of the better personal interaction between the tutor and the student hence easier identification of weaknesses. Additionally, quizzes provided by the teachers and submitted online provide an avenue for identification of key areas of focus.

CHAPTER 6: CONCLUSION AND RECOMMENDATIONS

The role of technology in enhancing music theory learning should not be undermined. Technology is quickly transforming the way tutors approach the teaching of music to university students, therefore the imperative to adjust these methods as well when teaching Kuwaiti students. Technology advancement alone will not improve the way music theory learning hence the need to adapt teaching techniques to modern technologies. Therefore, applying the technique of music theory websites is a unique and potential method of creating improvements. Supported by the identified evidence both in the analyzed primary data and previous studies conducted on the topic, embracing technology has multiple benefits in the grasp of concepts.

Recommendations

1. Aligning the classification schemes of work to the opportunities provided by technology will provide multiple benefits to various stakeholders. This may include a review of the school curriculum to fully adopt web-based methods of teaching music theory. This technique will empower students to engage in further personal research that will enhance their understanding of music theory.
2. Integrating the aspects of traditional methods of teaching music theory into the modern web-based techniques also promised better results. While the traditional

techniques have their weaknesses, some of its aspects are vital to the advancement of music theory knowledge. Hence, such a prudent move will ensure that students benefit from the best practices on both sides.

3. Cultivating a culture of personal research in students when using websites for learning is commendable. While the teacher plays a pivotal role in enhancing the understanding of multiple concepts by the student, the students' interests in certain concepts can easily increase through personal research. The teacher can achieve this by assigning reading exercises, administering quizzes and encouraging innovation in the process of learning.
4. Understanding the strengths and weaknesses of individual students is the first step in achieving personal improvement. The teacher should maintain personal contact with students at multiple times while teaching. Consequently, he/she becomes better placed to understand the strong points of the students and develop them while at the same time helping the students in their weak areas. Since class time is often limited, the teacher may maintain contact through online platforms.

Research Implications

This research highlights multiple challenges that students encounter when learning music theory using traditional methods. Technology provides opportunities for overcoming most of these challenges. Hence, the management at the music department of the Kuwaiti College of Basic Education can draw from the findings and recommendations of this study to create policies that enhance students understanding of music theory using technology. Further research is needed to aid in analyzing the influence of technology in the way teachers can adequately leverage technological advancement in teaching music theory.

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