ICT APPROACH TO MUSIC EDUCATION: A STUDY OF ICT IN MUSIC EDUCATION IN KATHMANDU VALLEY

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Abstract

Music education is a challenging aspect of education as it involves lot of interactivity. It includes the use of visual contents, textual contents, audio contents, tests, theories, concepts, recordings, performance and what not. Delivering music education from teachers' side to students and the interests of students learning music is a challenge that most institutions face. ICT is a very effective tool that provides access to information and technology. By using ICT, it is hoped that delivering music education could be more effective. Taking education into consideration in nation like Nepal and a place like the Kathmandu valley, lot of different aspects, policies and plans must be examined. The study involves review of multiple literature based on ICT in education and in music education, literatures based in Nepalese policies and plans, and questionnaire responses so that examination of what requires and what not, alternative solutions to economic barriers, skills and attitude requirements of teachers and students can be done. It is intended to find out challenges and constraints so that further research topics will evolve besides just learning the current practices.

Keywords: Music Education, Music Technology, ICT Support, ICT Music Education, Interactive Game in Music Education.

1 INTRODUCTION

Education in Music has been a subject matter that has been taken as an important subject in modern education systems. It is a field of arts, creativity, motivation, interest and self-realization that people want to learn with constraints and complexities. Music education is a field that observes the constraints of beliefs, motivation, interests, willingness, ability and capability to adapting to learning music. It includes theories, concepts, creativity, composition and improvisations among pupils of music. With growing competition of knowledge and research, there have been a lot of studies regarding teaching music in a more convenient manner by making use of modern technologies. When taking music education into consideration with Information and communication technologies (ICT), topics like improvement, efficiency, effectiveness, tools and options, adaptability etc are the main topics of research. Learning music in academic approach is to obtain detailed knowledge about the theories and practice of music. ICT alone is a broad concept and ICT in education is itself a technology that focuses on using technological information in practice of teaching especially using devices and application supporting communication (Zafari, 2019). ICT helps learning in a new and multiple ways.

The use of ICT is a major topic of research when considering education in modern world. ICT provides concepts and tools for modern education while giving a positive response to music education, a greater advantage in terms of teachers making use of ICT options and motivation of students in using such tools to self-learn and effectively learn music in academic concerns. ICT is an enabler for teachers to plan and implement learning activities and additional resources effectively in the field of education (Fan et al., 2016). Some practical examples are remote learning. It is good for teachers to use tools and technology by undertaking training and support from experts on adapting the technology (The World Bank, 2020). In modern era, the effective practice of teaching music in academic and informal learning is the subject matter of the research. By using the options, principles and experiences about teaching environment and learning environment of music by making use of technology centered to ICT, it is believed that effective knowledge, motivation and better education of music can be provided in modern time.

In Nepal as a whole, ICT has been considered by Ministry of Education (MOE) to provide students

with ICT skills to improve content delivery in classroom, improve the access to the learning contents, and to improve effectiveness in education in terms of management (Dhital, 2018). Multiple activities like establishing computer laboratories, institutional websites, internet connections have been conducted. It is same for the districts of the valley. Looking back at history, ICT was introduced in Nepal as a tool implemented for transformation of education. It was the tool for communication and transmission of information (Greenwood et al., 2018). The plan of 2016 - 2023 in educational strategies of Nepal developed by school sector development plan has already included topics about using ICT to max up the delivery channels for lessons and materials (Shrestha, 2018). ICT implementation is not easy in context of Nepal as there are many barriers. Barriers such as Infrastructures, professionalism of teachers, digital resources, knowledge etc. come into question when implementing ICT in music education (Joshi, 2017). It is a concern to understand the effectiveness about how effective this has been since establishment. Therefore, this study focuses on the ICT implementation in education with its base examination in music education.

1.1 Background of Study

This research is focused on studying practices of ICT in music education. The objectives listed undergo collection of data and information from direct sources or from research journals, magazines, books, interviews or other secondary sources. Survey and Questionnaire provided to teachers and students regarding the expectations of physical materials that the music classroom needs are quantitatively analyzed by basic statistical analysis.

Management is very much concerned with their success of delivering quality education. It is required that quantitative and qualitative methods are applied in order to decide upon what practices that management should undertake. Surveys and Questionnaire performed among teachers, students, and the management based on their views and expectations of ICT in music education provide the factor of success or failure of ICT approaches.

The works done by various authors have shown significant use of tools and technologies. The information from these papers add up value to this research by providing different tools and technologies available in the form of ICT options. With the help of quantitative data from simple questions and answers from teachers and students about what current technologies they have been using or what they prefer, recommendations based on preference of the most frequent answer in relationship to the qualitative find-outs from the secondary data can be suggested.

The surveys generate result sets and responses from the students about their interests and motivation inclining or declining in terms of education. Most of the expectations of the students need to be properly analyzed and included in the programmes regarding education using ICT so that their interest levels and learning curves are always inclined.

With the above modes of research, the final results of the research project is aimed to find out the different aspects of ICT supported music education in the Kathmandu Valley of Nepal here on termed as just the valley, or in bigger context Nepal.

1.2 Scope of Study

The study aims to reflect to current practices of ICT in music education from various places not just limiting in the practices within the valley. It hopes to extract most of the options from a global context so that cost-effective measures can be explored.

The study does not go all the way to defining strict requirements for the ICT approach to music. It rather investigates success and failure results and concludes with available approaches.

1.3 Limitations

The course of the study of the subject is short termed and therefore rapid results should be considered. The study is limited to ICT use in music education in Nepal however the data size is limited to about 300 to 400 samples only. There are many options in ICT for music education depending on the type of instruments and specifications. The study is not based on specifications rather than economical and applicable approaches to music. The study can further be extended from this limitation.

1.4 Problem Statement

The practice of ICT usage in music education faces the challenges of teacher's knowledge, belief, expectation, tools and technologies available in terms of economic concerns, knowledge and interests of teachers and students and availability of technology. This applies in terms of Nepal. According to Ministry of Education (MOE), the nation has not been able to make efficient use of technology as means of education due to lack of funding, infrastructure, qualified professionals, and policies of using technology-based education (Koirala, 2019). The need of this research adheres to the following problems:

- The cost of implementing ICT in a music education context in the valley of Nepal adds up to very high cost due to structures and technology equipment's required.
- Usually management field is not ready or supportive towards the conduct of music education with ICT.
- It is hard for teachers to accept and participate using technology over traditional approach due to professional aspects.

By researching on multiple sources for these knowledges, this research proposal aims to figure out the structural requirements, technology requirements, management requirements and professional requirements to ensure a balanced yet effective practice of ICT implemented music education in music classes.

1.5 Propose of the Study

The main purpose of this research is to study about structural requirements, technology requirements, management requirements and professional requirements for the sake of fulfilling proper music education using ICT in an economic environment. the following are the main objectives in order to reach the above goal.

1.6 Objectives

The main objectives of the study to determine the significance of music education by using technology approach are by fulfilling the following:

- To find out the requirements of physical structure, tools and technologies of music classes, propose infrastructures and basic hardware.
- To find out the role of the management in the field of ICT and music education.
- To setup professional development requirement among teachers in order to competitively deliver music education.

1.7 Research Questions

The study addresses the following questions:

- What are some hardware and software that can assist in delivering music education?
- What are the different economically feasible technologies that can be incorporated without compromising qualitative aspects?
- What are the requirements of teachers involved or are going to be involved in ICT aided music education?
- What are the aspects that institutional management should consider while implementing ICT based music education?

1.8 Significance of the Study

The research work opens insights about putting up basic requirements and the methods to follow while providing education using ICT. There are multiple tools and technologies present in field of ICT and most of them have been used in music education. In music classrooms, proper selection and installations of basic required equipment's is recommended. The use of teaching and evaluation tools like hardware and software are very important. The classification of such tools and technologies are the find outs of the research that have direct impact in the success of educational program. The research provides insights for teachers and students about required knowledge and professional development in order to properly implement ICT aided education.

2   LITERATURE REVIEW

This research literature review presents various aspects of concerns of music education based on ICT usage and results that lead to finding out the effective approach to implement music education in institutions by making use of ICT. This study examines the different concerns evaluated by multiple similar works done by other researchers so that applying ICT in music education can be properly implemented. There are many sources of research works that provide insight on how music education can be conducted using ICT. Some provide positive results while some provide matters that need to be avoided.

The study focuses on three topics that determine the success factors implementation of technology. First being the willingness, ability and perception of music teachers about using ICT in music education. Second is the expectation of students who are subjected to learn in ICT environment and third being the effective tools and measures that assist in the implementation of ICT in music education. The following sections talk about these topics in with review of related researches.

2.1 Willingness, Ability and Perception

The teachers are the major side that need to have positive attitude and correct beliefs about using ICT in music education. The knowledge about what teachers expect and what they already know about using ICT is what it takes to properly state out the requirements of ICT facilities. Aldama and Pozo researched about teachers' belief regarding ICT as change in teaching and learning process. The results suggested that Over Half of teachers perceive ICT as good for motivating students, 50% mentioned about being able to Access to Information, 53% mentioned about Motivation, 50% mentioned about active students, 43% mentioned about being able to develop strategies and 37% mentioned about student able to control task (Aldama & Pozo, 2016). The paper brings insight about the perspective from the teachers' side on implementing ICT in education. The beliefs about information access, motivation, task control, presentation and learning are positive in the study, these can be further investigated and improved with further research.

Eyles performed a research to find out the issues perceived by music teachers influencing their ability of using ICT in providing insight about the subjects that need to be reviewed in schools. This would help in implementing ICT education. 29 Questions were organized that focused on the information of teacher's background, information of school, implementation of ICT and professional development. The answer on teacher's perception of ICT, Resources music teachers have access to, Teachers incorporating ICT in music programs, teacher's confidence in ICT for their program, professional development that help teachers to incorporate ICT effectively, and enhancements for practices.

2.2 Expectations about using ICT

Students' expectation using ICT in music education is a factor that education framework should focus on. It is the students who are the main receiver of the knowledge. Expectations of ICT could vary from students' age, gender, location and motivation. Glusac, Makitan and Milanov prepared a questionnaire about use of informal computer usage such as yes, no question on use of music, games, social networks, communication, movies, photography etc. Questions about the expectations about using ICT as means of learning whether it can bring improvements in communication, motivation and knowledge quality. The study resulted in high priority of communication and socialization was Facebook, email, skype, messenger, viber and some others (Glusac et al., 2015). Students expect visual learning style over textbooks. The paper provides insight about what type of platforms are suggestible for use as communication support for applying ICT in music education.

2.3 Effective tools and measures

Throughout the research work the best possible means of teaching, the structure of classrooms, technologies to be used and effective practices are the key focus points. Therefore, multiple sources suggesting how ICT has been utilized and how ICT has benefited learning are reviewed. Fernandez et al researched to examine if improvement in knowledge and grades is seen in students using innovative methodology such as interactive and educational game. According to the research,

learning music improved due to use of technologies and made it more fun, progressive and educational (Fernandez et al., 2016). The evaluation results showed significant improvements. The positive response of the use of interactive technology such as interactive games is a motivation towards pointing out the effective practice in using ICT assisted music education.

2.4 Interactivity

Interactivity is one of the major topics of concern that plays a vital role in effectively deliver knowledge into students. Maric examined the possibility of practicing online gaming to learn music. The implementation included two websites. First one was classics for kids, and the second one New York Philharmonic Kidzone. These websites featured interactive games with matching rhythms, Note Name, Composer time machine, compose own music, Minuet Mixer, instrument frenzy, percussion showdown, music match instruments etc. The results suggest that the students can learn in class or in free time and master their music skills in a more pleasant and motivating environment (Maric, 2015). This type of article adds up the possibilities to interactive options while implementing ICT assisted music education.

3 RESEARCH DESIGN AND METHODOLOGY

3.1 Research Methodology

This research is focused on study of ICT (Kautish et al, 2008, 2012, 2013, 2020) in music education within the Kathmandu valley of Nepal. Collection of data and information has been obtained from direct sources through the use of questionnaire provided to teachers and students (different forms) regarding ICT related physical materials, software, skills etc. that the music classrooms need. Such questions provide quantitative data and by basic statistical analysis. Secondary sources such as research journals, magazines, books and a few others have also been collected.

Statistical analysis is carried out in order to access ICT approaches to music in context of the valley. The works done by various authors have shown significant use of tools and technologies that add up value to this research by providing different options available, analyzed further with the help of quantitative data from simple questions and answers from teachers and students about what current technologies they have been using, accessing their skills or what they prefer.

With the above modes of research, the final results of the research project are aimed to good study of ICT in music for successful and affordable approaches of music education.

3.2 Scope of Research

As described in chapter 1, the study simply aims to identify practices of ICT in music education however not limited to the valley only but to a global extent. Most of the common practices around the globe have also been extracted in order to analyze the integrity of such technology practices in the valley too.

3.3 Sampling

There are many private institutions and academic institutions in the valley dedicated to music. There are two different forms of questionnaire collected during the study classified for teachers and students. A total number of 300 students from different institutions have responded the 'student form' while 110 teachers have filled in the form for teachers from 500 and 150 invitational distribution through online medium.

3.4 Data Collection Method

Primary data have been gathered completely from Google forms in an electronic medium. Google forms are accessible online so that people can respond to. The questionnaires were based on different factors that were identified during the study of other literatures. The common questions like the age group, availability of materials provided by institutions, use of different software and application, preferences of different methods by the respondents were included in the questionnaire. The collected data were then exported to Microsoft Excel and to Statistical Packages for Social Science (SPSS), a package for data analysis and management.

3.5Research Approach

As mentioned earlier in the research is composed of primary data source as well as secondary sources. The secondary sources are used to formulate research topics, questions and to validations on different claims while primary data source is used for analysis and discussions based on the results. All the primary data gathered through Google forms exported to Microsoft Excel are imported to SPSS. By using SPSS, the results have been expressed as descriptive statistics along with generated graphs for each significant result such as age, gender etc.

This study is based on descriptive statistics. The first part of the data will analyses the respondent's demography while the descriptive statistics will generate the mean or mode for the concerned topics. This study is based on an examination on current prospective and views of the respondents and does not practice any experimental data therefore there are no other statistics results that need to be analyzed besides the descriptive.

4   DATA ANALYSIS AND FINDINGS OF RESEARCH

4.1Data Preparation

The respondent's profile about age group, gender, ICT preferences, Skills, Use of ICT are examined in the first part. Then followed by a descriptive statistical analysis to derive the results that relate to the study. This type of analysis provides results for the research goals. The data response that has been received is tabbed below.

Table 1: Data Collection Sample

Teachers online form	
Invited	150
Response	110
Students online form	
Invited	500
Response	300

As mentioned in previous chapter there are two types of forms with teacher and students being corresponding respondents. The following will discuss the demographic frequency statistics of each type of responses.

4.1.1   Demography of Students in favor of ICT

Table 2: Demography of Student in favour of ICT

Like ICT

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	293	97.7	97.7	97.7
	No	7	2.3	2.3	100.0
	Total	300	100.0	100.0	

Students were asked if they liked ICT or not in order to determine the interest in ICT for education. According to the questionnaire results out of 300 respondent's 97.7 percent of respondents like ICT in education, while a very few, i.e. 2.3 percent of respondents did not like ICT. According to this result the use of ICT is much favored by the students.

The distribution of respondents who like ICT in education is represented in the chart below. It can clearly be seen the majority of students like ICT.
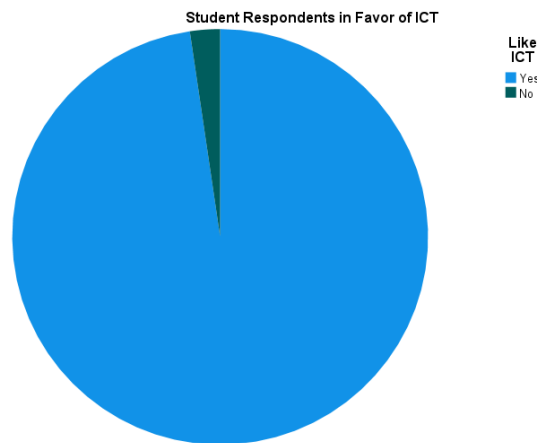
Figure 1: Chart of Students in Favour of ICT

4.1.2   Demography of students using computers and internet in class

Students were asked if they used computers and internet in their class and if yes for how often they used the computers and internet. This question was asked to find out how classrooms in the valley are undertaking the use of computers and internet. The following table shows the distribution.

Table 3: Demography of students using computers in class

Students using computers in class

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	53	17.7	17.7	17.7
	Rarely	59	19.7	19.7	37.3
	Sometimes	64	21.3	21.3	58.7
	Often	55	18.3	18.3	77.0
	All the time	69	23.0	23.0	100.0
	Total	300	100.0	100.0	

According to the table, there are only 17.7 percent students who do not use computer and internet in their classroom, 19.7 percent of students use computers and internet rarely while 21.3 percent use sometimes. There are 18.3 percent students often using computer in class and 23 percent using it all the time. It can be clearly seen that most of the students are familiar using computers and internet in the classroom. Those who never use computers in class are very few and could be the result of institutional policies or classroom policies. The chart below demonstrates how much students have been using computers and internet in their classroom.
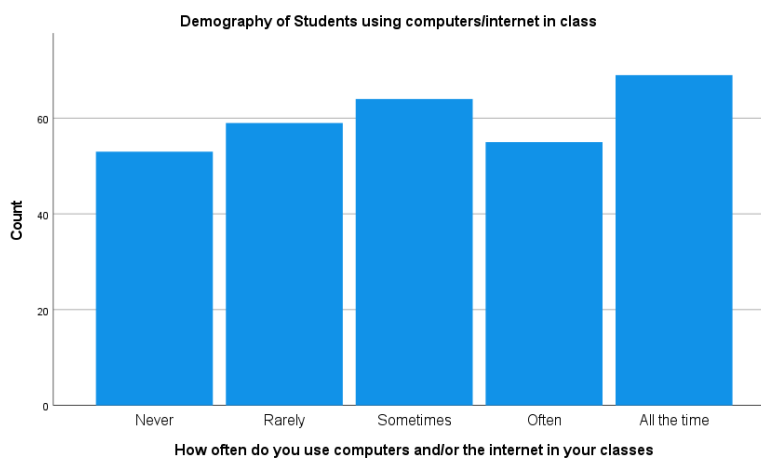

Figure 2: Chart of students using computers in class

5 Discussion, Recommendation and Conclusion

The discussions and recommendation on basis of the questions that have been set in the first chapter is as following.

5.1 Research Questions

5.1.1 What are some hardware and software that can assist in delivering music education?

According to the results that have been derived from the response data there are many software and hardware requirements that are in practice in terms of education. By taking reference to the software results, there are software like Guitar Pro, Garage Band, Yousician, Flat, Solfeg.io which are popular and can be used for effective teaching and practice. As most of the students and teachers are well familiar with this software and the popularity of these software is also high around the world, it can be recommended that use of these software will help ICT based music education.

It is also favorable that delivering education through the use of ICT often requires basic content creation and accessibility such as preparing notes, presentations, putting it online through network or the internet. Therefore, authoring tools such as word processor, spreadsheet, presentations, video broadcasts etc. could be installed into systems.

Hardware refers to different equipment physically available. The most used hardware are computers, Smart phones, Laptop, Netbook, Notebook, Tablets and Interactive Whiteboards. All of these have been used some or the other way in the valley as the results suggest. The management should be aware that improving on providing these kinds of hardware that are able to support software mentioned above will have a positive result in the future of music education. Most preferably mobile devices are highly favored by students and the teachers. There are instances that teachers have problem with regarding the availability of such hardware equipment's that directly affect the delivery of education.

Internet and network facility are the basic infrastructure required for the delivery of education that can help students and teachers in regular basis. On top of it is not so favorable or in practice the use of digital camera in context of music education. The effect of not using such is not significant.

5.1.2 What are the different economically feasible technologies that can be incorporated without compromising qualitative aspects?

As suggested by the result, delivering education in Kathmandu valley is not just about finding out the trends and technology. It is also a significant topic to look out for the feasibility of technology as well as economy. Such alternatives should not affect quality aspects. When we talk about economic feasibility, we often talk about things that are free of cost or very minimal in cost. It is the part of this study to find out some of the economically feasible tools and technology that will build up a positive effect in education, especially music as in the context of the research.

In the analysis most of the teachers as well as students were found to be using broadcasting tools from the internet as their source of resource finding. Today there are many websites and web applications that help in broadcasting such as to name one is YouTube. It is a free broadcasting website where people can post their videos and subscribers can privately or publicly access those contents. In context of teaching, teachers can use the facility of YouTube to deliver their teachings to their students. Students can also take reference to other contents from renowned creators. Such is an economically feasible solution towards education.

Using smart phones and internet on the device is quite expensive however an institutional internet distributed through a network that can be connected via the mobile devices will save some cost that individual accumulation would have cost. Such could also be a part of economical solution towards using technology. Software such as Guitar Pro and Garage Band add up to some cost.

5.1.3 What are the requirements of teachers involved or are going to be involved in ICT aided music education?

It is by addressing the results of the survey, that the strong emphasis is on the skill requirements of the teachers can be discussed. Teachers usually require skills to generate word documents,

spreadsheets, presentations, ability to download software, organizing documents and directories, online assessments, social networking, participate in discussion forums etc. For this they must undertake professional development courses based on these areas of skills.

According to the results, teachers are only a somewhat in the skills such as word-processing, emails, digital photos, spreadsheets, discussion forums and social networking. The participation in courses in such professional development course are also seen not so significant. It is quite recommendable that courses on these skills are well delivered to the teachers as most of the teachers in this field are among 18 to 30 years of age and a minority above 40. As seen in the result, teachers are more skilled with presentations and interactive whiteboards, the significant delivery or improvement of skills in other professional skills would be advantageous both for teachers and students. There is no age or gender preferences when accessing skill of the teachers.

5.1.4 What are the aspects that institutional management should consider while implementing ICT based music education?

As suggested earlier, the most important is the infrastructure, hardware and software requirement. Due to infrastructure requirements there could be cost added to the implementation. However, most of the institutions in the valley do not prioritize or do not set ICT as the main goal of the organization. It is also a major problem that parents of the students are not so in favor of ICT mainly due to multiple factors in the country. Management should focus on improvising lot of aspects that the institution is missing. These aspects have been found in with the help of the questionnaire in a statistical form.

The results suggest that students and teachers have been using computers in the classroom most of the time provided by the institution however without the internet. As discussed earlier, internet is very important as it is the medium deliver contents to the students. Management must not neglect this concern over the internet. Teachers are in favor of ICT and believe that taking courses or trainings in ICT assistance would be helpful. An organization as a whole should also focus on delivering training to the teachers of their institution. It is also one of the tasks that management must fulfill is to deliver course materials and required software available at the institution. Software such as Guitar Pro, Garage Band, Yousician, Flat, Solfeg.io, etc. should be purchased for use within the premises of the institution or so for students to be able to access them.

5.2 Conclusion

In this study different aspects of ICT in music education has been talked about based on the findings from the data collected. Two types of questionnaire were distributed and collected for the purpose of fulfilling objectives of finding out the software, hardware and infrastructure involved in ICT based music education, finding out the skills requirements of the teachers who are involved in such education and the role of management that can affect the positive or negative results in education. According to the study, computers equipment's, availability of internet and network infrastructures, use of software related to music learning such as Guitar Pro, Garage Band, Yousician, Flat, Solfeg.io etc are recommended. These are some basic requirements and practice that music institutions need to undertake. The participation of management in terms of supporting education is also significant as source of funding and decision of implementing the above-mentioned software and hardware must come from the management. Considering teachers' requirement for developing or learning basic and advanced professional skills as a high priority by the management will definitely motivate the teachers and students in effectively conducting ICT based classes. It was also found that teachers inside the valley are willing to take up ICT as part of education and have high interest in developing professional skills on different computer aided tasks like word processing, presentation, spreadsheet, email, social networking, discussion forums etc.

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