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# ICT INDICATORS AND MUSIC PERFORMANCE OF MAPEH STUDENTS: THE MEDIATING ROLE OF TEACHING COMPETENCY

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**Abstract:**
This study aimed to determine the mediating effect of teaching competency on the relationship between ICT Indicators and the music performance of MAPEH students. The researcher utilizes a quantitative, non-experimental design via a correlational technique. The researcher obtained data from 300 Grade 11 and 12 students of the three national high schools under the division of Davao del Sur in Region XI. The researcher utilized a stratified random sampling technique and an online survey mode of data collection. The researcher also utilized the statistical tools: mean, Pearson r, regression and med graph using the Sobel z- test. The study results found that there is a very high mean score of teaching competency, high levels of ICT indicators and music performance of MAPEH students. Furthermore, there are significant relationships between ICT indicators and music performance, ICT indicators and teaching competency and teaching competency and music performance of MAPEH students. Further, the result revealed that there was complete mediation on the effect of teaching competency on the relationship between ICT Indicators and the music performance of MAPEH students.

**Keywords:** education, teaching competency, ICT indicators, music performance, students, mediating effect, Philippines

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## 1. Introduction

Music performance assessment is a multifaceted activity, as stated by Iusca (2013), its results depend on a variety of musical elements related to the assessment context evaluators' characteristics or performers' personality features and psychological states including the student's musical training. Another problem is that many musicians result to developing conditions that involve physical suffering, such as pain in the muscles used for playing the instrument due to many hours of training, repetition, and extreme tiredness. The performance-related disorder is defined by pain, weakness, numbness, tingling or other symptoms which interfere with the ability to play the instrument at the level the musician is accustomed to (Burin & Osorio, 2017).

It was mentioned by Keay (2018) that creating an optimal experience relies on several factors, many of which depend on the individual. Specific preferences, personalities, and abilities must be considered, which makes the avenue of music performance and flow a personal and subjective endeavor. The communicative and emotionally stimulating aspects of music performance create an experience that is difficult to convey through words, and many of these experiences come out in a way that the participants are able to achieve a state of flow. Moreover, music performance is of great help for the acquisition and improvement of motor abilities including the ability to focus on the task at hand and the capacity to disregard unimportant information (Leon, Guillen & Alfonso, 2014).

Also, it was pointed out by Behar, Rosas, Longhi, and Bernardi (2013) that a composition performed by the computer associated with tools with these characteristics, can also assist in developing competencies for music technology in the educational context. Furthermore, the expansion of online music resources through the utilization of ICT has also shaped the sphere of music learning, both in the classroom and beyond. Millions of instructional music videos can be found via online portals such as YouTube and are used not only by individuals in informal learning practices but being actively incorporated into educational frameworks (Waddell & Williamon, 2019).

There are only a few studies that discussed teaching competency, music performance, and ICT indicators. The researcher did not come across any study on ICT indicators, music performance, and teaching competency and there is no similar or existing study using the same variables being conducted in the local or regional setting. Existing studies focus only on the relationship of the main variables while in this study, the researcher will discuss the relationship of each indicator of two identified variables with a mediating effect of another variable. The result of this study may be a good benchmark for a development plan. Therefore, there is a need and urgency to conduct this study in order to contribute to the existing body of knowledge in the field of education.

## 2. Literature Review

### 2.1 ICT Indicators

There is a growing demand to incorporate ICT in the mainstream of teaching in vocational education (Bliuc, Casey, Bachfischer, Goodyear & Ellis, 2012; Khan 2015) to have positive effects on teaching and learning which are defined approaches as strategies adopted by teachers for their effective teaching and achievement of students. ICT literate and expert teachers are the need of the time in all types of educational institutions for their success. As, ICT indicators of students enhanced their teaching theoretically and practically in vocational education specifically and tertiary education generally (Khan & Markauskaite, 2017). Teaching is becoming one of the most challenging professions due to the expansion of knowledge and demands to learn modern technologies to use in the teaching-learning process. ICT can provide more flexible and effective ways or methods for the professional development of teachers to maintain their jobs, improve their competencies and connect them to the global teacher community (Sahito & Vaisanen, 2017).

The first indicator is ease of use. Although the factors such as perceived usefulness and perceived ease-of-use from the Technology Acceptance Model and the adoption of ICT in education have already been extensively studied before (Cassim & Obono, 2011; Terzis & Economides, 2011), much of the variation in ICT adoption remains unexplained and there is still lack of studies that investigated into the incremental effect of other determinants such as ICT literacy of educators and the school climate and support, especially in the Mauritian context (Baturay, Gökçearslan & Ke, 2017).

The second indicator is teaching-learning method. The use of ICT in education improves the teaching and learning method by providing support to teachers and students and connecting them to each other and to a wide range of information in an efficient way (Kreijns, Vermeulen, Kirschner, Buuren & Acker, 2013). There is increasing evidence with regard to the benefits of ICT usage in education (Blackwell, Lauricella & Wartella, 2013; Tondeur et al., 2017). It was also observed by Perrotta (2013) that ICT usage in education assists teachers in carrying out various tasks which include: searching for information and preparing lesson materials; presenting information such as using PowerPoint presentations, interactive whiteboards, and data projectors; collection and management of data about students' activities; collaborating with colleagues; communicating with students and parents; and sharing resources to the wider education community.

The third indicator is ethics. It is high time now for careful inspection of the legal and ethical aspects of ICT as there are not enough guidelines available in this field as compared to those available in conventional branches of science and technology. More importantly, now ICT is not limited to the scientists and software engineers alone rather it has become a widespread phenomenon, affecting people at various stages in their roles such as customers, service providers, participants, middlemen, and many more (Mishra, 2015).

The next indicator is special needs. Inclusion is promoted and highlighted by the national curriculum; nonetheless, within special circumstances, special education may be delivered on an individual basis, or otherwise through separate groups). In its different forms, ICT is recognized as bridging the gap and accordingly facilitating inclusion for those learners with special education needs (Sik-Lányi, Hoogerwerf, Miesenberger & Cudd, 2015). In the field of ICT, development is quick, with new technological tools and programs introduced on a daily basis.

Significant investments are made by schools in the ICT domain, with ICT recognized as enabling students with special education needs to be included in the classroom setting, thus allowing them to work alongside their peers, and use assistive technology in an effort to provide learners with the ability to fulfill educational goals (Brodin, 2010).

The fifth indicator is infrastructure. ICT infrastructure plays a substantial role in catalyzing economic growth, especially in today's era of internet and mobile telecommunication (Ishida, 2015; Lee & Brahmasrene, 2014; Pradhan, Arvin, Norman & Bele, 2014). Information and communication technology infrastructure is a leading growth enabler in countries that have realized its importance. Not surprisingly, therefore, many developing nations are working hard to internalize ICT, balancing the limited allocation of their revenues, to catch up rapidly with the developed economies (Bankole, Bryson & Brown, 2013; Kooshki & Ismail, 2011). In fact, the adoption of ICT-enhanced policies is one of the top agendas for governments today in most developing countries.

The sixth indicator is professional development. The proliferation of ICT demands improved quality of teaching and learning in education to improve learner attainment. ICT offers greater opportunities to access learning, redress inequalities, and improve the quality of teaching and learning. ICT changes fundamentally the teachers' role as the use of ICT is becoming a part of everyday life in schools. Therefore, there is a need to determine the kind of ICT professional development interventions that are most effective for improving teaching and learning using ICT. These activities in turn help teachers develop digital fluency and pedagogies (Dlamini & Mbatha, 2018; Olofsson, Lindberg, Fransson, & Hauge, 2011).

The seventh indicator is access. ICT plays a role in the socioeconomic development of countries. A proposed model analyzes the relationship between ICT access including available ICT infrastructure and individuals' access to ICT, ICT use such as ICT intensity and usage, ICT skills, and socioeconomic development. ICT usage and ICT skills enhance the effect of ICT access on socio-economic development. The proposed model was robust with respect to the development level (Alderete, 2017). It was described by Thompson, Jaeger, Taylor, Subramaniam, and Bertot (2014) that digital inclusion, or full access to the digital information and communication infrastructure, as existing on three levels namely: physical access, including economic and political factors affecting access to ICT and ICT infrastructures; intellectual access, including education, training, and literacies; and social access, including social and cultural factors that act as supports or barriers to ICT access and use.

The next indicator is health. ICT may have a negative effect on the environment and health. This is not only because of its operational usage but also because of the electronic waste generated at the end of the useful lifecycle of an ICT gadget. ICT has helped us solve many challenges such as connecting us globally, entertaining us in every possible way, and helping us to be more productive, efficient, and effective. However, this valuable industry has a negative side too and that is its contribution towards greenhouse gas emissions. Conversely, despite having a challenging aspect to it, ICT can be an enabler to alleviate climate change and global warming (Askarzai, 2011).

The ninth indicator is policy. ICT is often represented as a factor in global economic growth and social development. Consequently, countries and governments invest large amounts of resources in the ICT sector. However, it is not certain whether the results of these investments necessarily match expectations. In order to investigate this, a study evaluated government policies for ICT growth in a developing country by extending and utilizing the design-actuality gaps framework. The analysis shows that not only there are gaps between policy design and actuality but also the dimensions of design and actuality is different (Palvia, Baqir & Nemati, 2017).

The final indicator is ICT in the curriculum context. ICT is recognized as an essential tool for improving the quality of education. The vital role of teachers in the effective adoption of ICT in education has been given prominence in the latest studies in the field (Comi, Argentin, Gui, Origo & Pagani, 2017; Englund, Olofsson & Price, 2017; Nikolopoulou & Gialamas, 2016).

**2.2 Music Performance**

It is often debated among educators and scholars on issues related to music performances, its anxiety, self-efficacy, and quality performance experiences. Indicators or symptoms which include an increased heart rate, sweating, and dry mouth had all contributed to stress and made the physical manifestations or utilization of musical instruments or singing quite difficult (Taborsky, 2018). It is with this that music educators often provided inappropriate advice on how to cope with musical performance anxiety. Students' performers or musicians will not fall into stress and anxiety during a performance if they are well prepared for a given musical piece; however, it does not mean that the longer one has to practice, a guarantee for anxiety avoidance can be made (Palmer, 2017).

The first indicator is mastery experience wherein Mindful learning may contribute to the improvement of mastery experience in creativity games through flow experience and self-efficacy. Mindful learning may directly influence the process of developing a mastery experience by improving the acquisition of knowledge, remaining open to feedback, and enhancing focus and awareness. These mindful learning techniques were found to be effective in improving school students' mastery experience in music performance (Bakosh, Snow, Tobias, Houlihan, Barbosa-Leiker, 2016). Therefore, when mindful learning is implemented by the student, creativity may be enhanced (Davenport

& Pagnini, 2016) and this improved performance is likely to contribute to the feeling of success, otherwise known as mastery experience.

The next indicator is vicarious experiences wherein a peer's positive past experience should increase motivation to seek the same. Similarly, social cognitive theory predicts that successfully accomplishing a task should boost self-efficacy to accomplish similar tasks in the future. A group reported previously that vicarious experiences influence attitudes and management. In this study, it is examined whether peers' vicarious experiences like having a close friend who had undergone the same, would lead to a more favorable attitude (Berkowitz, Bell, Kravitz & Feldman, 2012). Also, it was stated by Bandura (2011) that these are manifested whenever someone else is observed modeling the skill or ability in question. The degree to which the observer identifies with the model can adjust the effects of the experience.

The third indicator is verbal/social persuasion wherein its concept extends to the school community as a whole. Verbal/social persuasion may be limited in its impact, but it can contribute to success by driving an individual to initiate a new practice or strategy, tackle a task, or work with perseverance to achieve goals. Continuing education and professional development opportunities fall under this category. Gaining knowledge and experience regarding specific tools for success can support self-efficacy beliefs. However, any new skills or insights gained may not have an effect on self-efficacy until they are put into practice and done so with success (Trower, 2019).

The last indicator is the physiological state. The strength of the contribution made by each source varies depending on the domain in question and on the cognitive processing strategies of the individual. The manner in which the multiple sources of information are weighted and combined influences the resulting self-efficacy. These are emotional/physiological states that are sources of efficacy information. People may view a state of arousal as an energizing factor that can contribute to a successful performance, or they may view arousal as completely disabling. Thus, teachers construct their self-efficacy beliefs through the interpretation and integration of information from these four sources. (Mohamadi, Asadzadeh, Ahadi & Jomehri, 2011).

### 2.3 Teaching Competency

A teacher's demonstrated impact on students' learning is established through student achievement test scores, observed pedagogical practices, or employer or student surveys. Teacher quality is the single most important feature of the schools that boost student achievement and the second most important determinant of student learning after family background. Students who have good teachers learn more than students who have underperforming teachers. Teacher quality is reflected in their performance in the classroom (Kennedy, 2016). Competence, at the individual level, is an ability of an employee to offer superior performance in assigned tasks. It was also stated by Boyatzis, Stubbs, and Taylor (2016) that competence is an underlying characteristic of a person, motives, traits, abilities, aspects of image or social role, and knowledge that a person is able to use.

The first indicator is knowledge which refers to subject-specific teacher knowledge and the scientific understanding regarding teachers' professional knowledge for teaching. It is further subdivided into content knowledge, pedagogical content knowledge, and general pedagogical knowledge (Konig et al., 2016). Evaluations are usually important for teacher education programs because they can reveal information about the development needs of teacher education (Qian & Youngs, 2016). It is emphasized that knowledge is at the intersection between content and pedagogical knowledge, in the teacher's ability to transform his or her knowledge of the subject in ways that are didactically impacting and yet adaptable to the diversity of the students, in terms of their abilities and baggage (Santos, 2015).

The second indicator is skills which are tackled in an investigation by Schneider and Gowan (2013) regarding elementary teachers and found that these teachers were equally skilled in the three investigated areas; identifying what an item measured, analyzing student work, and determining the next step in instruction. In addition, providing students with targeted feedback was the most difficult task for the teachers in the study. It was mentioned by Amusan (2014) that teachers who had specialties in science and technology-based courses displayed better topic-related pedagogical skills. Effective use of instructional time had a high predictive effect on teachers' pedagogical skills. However, a skills gap appears to exist in private schooling. Based on a survey of private school teachers and leaders in three states, a large number identified important skills that they had to learn on the job. As it turns out, there is significant overlap between the skills necessary to be successful in teaching and leading in private schools and in public schools which is the sector toward which most teacher and leader preparation programs gear their training but still there are unique skills that private school teachers and leaders need that they are not receiving in their training (McShane, 2019).

The last indicator is an attitude which is a mindset that affects how a person thinks and acts. Attitude can influence a person's performance positively or negatively. Similarly, attitude could also affect how well a teacher plans and prepares for his/her lessons. The attitude of a teacher, consciously or unconsciously, greatly affects students' academic performance. It has been established that teachers' attitudes highly influence students' interest in learning (Omolara & Adebukola, 2015). There is a need to have an attitude towards creative teaching among teachers because if they have a positive attitude towards creative teaching then only, they can create a supportive environment through effective strategies that will help the students to grow. Attitude a is characteristic of personality that illustrates the likes and dislikes of an individual. Attitude may be instinctive or acquired. It may be learned in an environment in course of development. The kind of environment in which an individual grows has an impact on his attitude (Katoch, 2017).

### 2.4 Correlation between Measures

Competency in education particularly in ICT is significant when it comes to students' music performances since a high level of teaching competency means high music

performance for students when tasks are given (Olga, 2017). This is where teaching competencies include not only the acquisition and demonstration of the composite skills required such as establishing a lesson and fluency in questioning (Walker, 2016), recognizing music performances (Halls, 2017), and classroom supervision (Thebault, 2016).

Various forms of ICT implementation in education expand opportunities for flexible and up-to-date learning and also reinforce teachers' reflection and collaboration, the latter having been suggested as key components for teachers' career development. Indeed, teachers' music performance and levels of confidence in using ICT have been constantly found to be common enablers for prospective ICT integration (Hammond, Reynolds, & Ingram, 2011; Sang, Valcke, Braak, & Tondeur, 2010). It was also mentioned by Kreijns, Vermeulen, Kirschner, Buuren, and Acker (2013) that ICT prevails as one of the milestones of the modern educational system.

In competency, it highlighted acquired skills, knowledge through learning, attitudes, and behaviors all attributed to quality standards learners may get if teachers are well-equipped and motivated in fostering learning (Sivakumar, 2016). The skills in ICT have gained quintessential importance not only for education but also for employment and daily life use in the 21st century (Goalluth, 2016). Therefore, it can be said that during the process of student training, attempts should be made not only to portray teaching competencies to students but also to improve their music performance beliefs. As student self-efficacy is directly associated with motivation, it directly affects learning outcomes generated in the class (Ekinci, 2012). Student music performance self-efficacy may also be defined as students' beliefs or judgments in their ICT indicators to enhance students' learning.

Lastly, a research study by Al-Ruz and Khasaweh (2011) which tested a model in which technology use by teachers was correlated with a number of university-based and school-based factors, reported that music performance had the highest effect on technology integration. Similar findings were obtained by another study (Niederhauser & Perkmen, 2010), which found that music performance was the strongest predictor of teachers' intentions to use various software and willingness to use technology in their future classrooms. It is also worth noting that various studies have reported that there were no gender differences in terms of music performance among student ICT indicators. Improved teacher competency levels in technology use have been linked to increased music performance among students (Wang & Wu, 2015), which, following a concept of social learning would in turn lead to an increased usage of technology.

This study is anchored on the theory Diffusion of Innovations by Rogers (2003) which states the process by which an innovation is communicated through certain channels and over time among the members of a social system. The process starts with knowledge of the first channel that represents characteristics of the decision-making unit by the ICT users in order to integrate the technology. It then ends with confirmation by the users to accept the technology and integrate it accordingly (Ghavifekr & Rosdy, 2015).

Another very important theory is the Uses and Gratifications Theory by Blumer and Katz, 1974. This theory is a user-centered approach that focuses on how people use media for their own personal uses and gratification. It emphasizes motives and the self-perceived needs of audience members. Blumer and Katz argued that different people could use the same communication message for different purposes. The same media content may gratify the different needs of different individuals. This theory suggests that media has no power over audiences. Instead, audiences are highly active in their media usage, seeking out media to fulfill a certain need.

This study is also supported by the Generative Theory of Tonal Music (GTTM) by Lerdahl and Jackendoff (1983) which defines the distance between time-span trees, on the hypothesis that this might coincide with the psychological resemblance between melodies heard by human listeners. It was stated by Hirata, Tojo & Hamanaka (2015) that in order to confirm the feasibility of the proposed framework, an experiment was conducted to determine whether the distance calculated on the basis of the framework reflects cognitive distance in human listeners.

## 3. Material and Methods

This study employed a non-experimental quantitative design utilizing the descriptive correlation technique of research which is designed to gather data, ideas, facts, and information related to the study. In non-experimental research, researchers collect data without making changes or introducing treatments (Gehle, 2013). In this study, the variables were not manipulated, and the setting was not controlled. Descriptive-correlation research design describes and interprets what is, and reveals conditions and relationships that exist and do not exist (Calderon, 2006; Calmorin, 2007). The study is descriptive in nature since it assessed the levels of ICT indicators, music performance, and teaching competencies. This is correlational since it investigated the relationship between variables such as ICT indicators, music performance, and teaching competency, with the use of the survey questionnaire as a tool in gathering the primary data.

Moreover, a mediation model was used in this study. The mediation model is one that seeks to identify and explicate the mechanism or process that underlies an observed relationship between an independent variable (ICT Indicators) and a dependent variable (music performance) via the inclusion of a third explanatory variable, known as a mediator variable (teaching competency). Thus, the mediator variable serves to clarify the nature of the relationship between the independent and dependent variables. In other words, mediating relationships occur when a third variable plays an important role in governing the relationship between the other two variables (MacKinnon, 2008).

There was a total of 300 senior high school students (Grade levels 11 and 12) from the three public secondary schools under the Division of Davao del Sur, specifically the following schools: School A NHS, School B NHS, and School C NHS. Stratified random sampling was employed in the study such that all Grades 11 and 12 students had a chance to be selected and considered for inclusion in the final sample. This is a sampling

technique in which the population is divided into groups called strata. In this case the Grades 11 and 12 senior high school students only were the groups to become respondents. Moreover, the idea was that the groupings were made so that the population units within the groups are similar (Salkind, 2007).

Further, only officially enrolled students of Grade levels 11 and 12 for SY 2021-2022 or bona fide students of the 3 identified national high schools were included as samples as they were the only ones who fit the criteria that could answer the questions in the survey questionnaire of the study. Other students who were not enrolled in Grade levels 11 and 12 in SY 2021-2022 and who did not belong to the identified areas (Schools A, B, and C) or were enrolled in private schools are deemed excluded from the study. Lastly, elementary and junior high school students (Grades 7, 8, 9, and 10) students were excluded from the study. The respondents were chosen accordingly to answer the questionnaire with confidentiality. The target respondents were free to decline to participate in the survey. They were forced to answer the research questionnaire and encouraged to return the same to the researcher for its automatic disposal. Moreover, they can withdraw anytime their participation in the research process if they feel uncomfortable about the study since they were given the free will to participate without any form of consequence or penalty.

This scholarly work employed the following statistical tools: Mean to determine the levels of ICT indicators, music performance, and teaching competency. Pearson Product Moment Correlation (Pearson r) to determine a significant relationship between ICT indicators, music performance, and teaching competency. Medgraph using the Sobel z-test was employed to identify the mediating effect of teaching competency on the relationship between ICT Indicators and the Music Performance of MAPEH students.

## 4. Results and Discussion

**Table 1:** Level of ICT Indicators

| **Indicators** | **Mean** | **SD** | **Descriptive Level** |
|---|---|---|---|
| Ease of use | 4.26 | 0.545 | Very High |
| Teaching-learning method | 4.21 | 0.586 | Very High |
| Ethics | 4.14 | 0.653 | High |
| Special needs | 4.21 | 0.542 | Very High |
| Infrastructure | 4.17 | 0.575 | High |
| Professional development | 4.23 | 0.540 | Very High |
| Access | 4.12 | 0.672 | High |
| Health | 4.07 | 0.652 | High |
| Policy | 4.28 | 0.621 | Very High |
| ICT in curriculum context | 4.22 | 0.533 | Very High |
| **Overall** | **4.19** | **0.463** | **High** |

The level of ICT indicators is high resulting from the very high and high levels of responses. The indicators policy, ease of use, professional development, ICT in curriculum context, teaching-learning method, and special needs have very high ratings.

Further, the indicators of infrastructure, ethics, access, and health have high ratings. These indicators are arranged from the highest to the lowest level. The very high level of policy is suggestive of the very high extent of investment of resources in the ICT sector. This claim is in line with Palvia et al. (2017) wherein a study evaluated government policies for ICT growth in a developing country by extending and utilizing the design-actuality as ICT is often represented as a factor in global economic growth and social development.

The very high level of ease of use suggests the very high extent of perceived usefulness, perceived ease-of-use, and the adoption of ICT in education. This is also in line with various authors (Baturay et al., 2017; Cassim & Obono, 2011; Terzis & Economides, 2011) stating that much of the variation in ICT adoption investigated the incremental effect of other determinants such as ICT literacy of educators and the school climate and support. Moreover, the very high level of professional development is indicative of the very highly improved quality of teaching and learning in education to improve learner attainment. This claim concurs with various authors (Dlamini & Mbatha, 2018; Olofsson et al., 2011) who mentioned that ICT offers greater opportunities to access learning, redress inequalities, and improve the quality of teaching and learning. To change education and improve core activities in the educational setting through ICT, the implementation must be accompanied by meaningful and effective ICT teacher development activities.

In addition, the very high level of ICT in the curriculum context is suggestive of the very high extent of recognizing ICT as an essential tool for improving the quality of education. This claim is in line with various authors (Comi et al., 2017; Englund et al., 2017; Nikolopoulou & Gialamas, 2016) wherein governments all over the world have accepted the fact that ICT does play a significant role in improving education and massive investments have been made. The vital role of teachers in the effective adoption of ICT in education has been given prominence in the latest studies. Further, the very high level of teaching-learning method suggests the very high use of ICT in education that improves the teaching and learning method. This is in line with various authors (Blackwell et al., 2013; Perrotta, 2013; Tondeur et al., 2017) who stated that there is increasing evidence with regard to the benefits of ICT usage in education and that ICT usage in education assists teachers in carrying out various tasks.

Additionally, the very high level of special needs is suggestive of the very high extent of inclusion as promoted and highlighted by the national curriculum. This claim is in line with various authors (Brodin, 2010; Sik-Lányi et al., 2015) wherein ICT is recognized as bridging the gap and accordingly facilitating inclusion for those learners with special education needs. Significant investments are made by schools in the ICT domain, with ICT recognized as enabling students with special education needs to be included in the classroom setting. Also, the high level of infrastructure suggests that ICT infrastructure plays a highly substantial role in catalyzing economic growth. This is also in line with various authors (Bankole et al., 2013; Kooshki & Ismail, 2011) stating that information and communication technology infrastructure is a leading growth enabler in

countries that have realized its importance. The adoption of ICT-enhanced policies is one of the top agendas for governments today in most developing countries.

Furthermore, the high level of ethics is indicative of the high extent of careful inspection of the legal and ethical aspects of ICT. This claim concurs with various authors (Bourgeois, 2014; Mishra, 2015) who mentioned that it has become the moral responsibility of sociologists, business people, and scientists to decide in which way ICT can be best utilized. Today's digital technologies have created new categories of ethical dilemmas. Similarly, the high level of access is suggestive of the high extent of the role of ICT in the socioeconomic development of countries. This claim is in line with various authors (Alderete, 2017; Thompson et al., 2014) wherein ICT usage and ICT skills enhance the effect of ICT access on socio-economic development. Digital inclusion, or full access to the digital information and communication infrastructure, exists on three levels namely: physical access, intellectual access, and social access. Lastly, the high level of health suggests the high effect of ICT on the environment and health. This is in line with Askarzai (2011) who stated that ICT has helped us solve many challenges such as connecting us globally, entertaining us in every possible way, and helping us to be more productive, efficient, and effective. ICT can also be an enabler to alleviate climate change and global warming.

**Table 2:** Level of Music Performance

| **Indicators** | **Mean** | **SD** | **Descriptive Level** |
|---|---|---|---|
| Mastery experiences | 4.13 | 0.607 | High |
| Vicarious experiences | 4.09 | 0.626 | High |
| Verbal/social persuasion | 4.13 | 0.645 | High |
| Physiological state | 4.19 | 0.633 | High |
| **Overall** | **4.14** | **0.567** | **High** |

The high level of music performance resulted from the high-level responses. The indicators of physiological state, mastery experiences, verbal/social persuasion, and vicarious experiences were arranged from highest to lowest. The high level of physiological state is indicative of the high strength of the contribution and cognitive processing strategies of the individual. This claim is in line with Mohamadi et al. (2011) wherein emotional/physiological states are sources of efficacy information. Teachers construct their self-efficacy beliefs through the interpretation and integration of information from such sources. Further, the high level of mastery experiences is suggestive of the high extent of mindful learning that contributes to the improvement of mastery experience in creativity games through flow experience and self-efficacy. This claim is in line with various authors (Bakosh et al., 2016; Davenport & Pagnini, 2016) stating that mindful learning techniques are found to be effective in improving school students' mastery experience in music performance. When mindful learning is implemented by the student, creativity may be enhanced and this improved performance is likely to contribute to the feeling of success or mastery experience.

In addition, the high level of verbal/social persuasion signifies that collective efficacy is highly powerful as it extends to the school community as a whole. This claim concurs with Trower (2019) who mentioned that verbal/social persuasion can contribute to success by driving an individual to initiate a new practice or strategy, tackle a task, or work with perseverance to achieve goals. Gaining knowledge and experience regarding specific tools for success can support self-efficacy beliefs. Lastly, the high level of vicarious experiences indicative of peers' high positive past experiences should increase motivation to seek the same. This is aligned with the statements by various authors (Bandura, 2011; Berkowitz et al., 2012) wherein peers' vicarious experiences like having a close friend who had undergone the same, would lead to a more favorable attitude. When the observer identifies with the model, and the model experiences success, the observer's efficacy is increased.

**Table 3:** Level of Teaching Competency

| **Indicators** | **Mean** | **SD** | **Descriptive Level** |
|---|---|---|---|
| Knowledge | 4.40 | 0.487 | Very High |
| Skills | 4.32 | 0.489 | Very High |
| Attitude | 4.35 | 0.447 | Very High |
| **Overall** | **4.36** | **0.427** | **Very High** |

The level of teaching competency is very high resulting from the very high levels of responses. The indicators of knowledge, attitude, and skills have very high ratings. These indicators are arranged from the highest to the lowest level. The very high level of knowledge is suggestive of the very high extent of subject-specific teacher knowledge and the scientific understanding regarding teachers' professional knowledge for teaching. This claim is in line with various authors (Qian & Youngs, 2016; Santos, 2015) wherein evaluations are important for teacher education programs because they can reveal information about the development needs of teacher education. It is emphasized that knowledge is at the intersection between content and pedagogical knowledge, in the teacher's ability to transform his or her knowledge of the subject in ways that are didactically impacting and yet adaptable to the diversity of the students, in terms of their abilities and baggage.

In addition, the very high level of attitude is suggestive of the very high extent of the mindset that affects how a person thinks and acts. This claim is in line with various authors (Katoch, 2017; Omolara & Adebukola, 2015) who mentioned that the attitude of a teacher, consciously or unconsciously, greatly affects students' academic performance. It has been established that teachers' attitudes highly influence students' interest in learning. The kind of environment in which an individual grows has an impact on his attitude. Further, the very high level of skills suggests the very high extent to which teachers are equally skilled in identifying what an item measured, analyzing student work, and determining the next step in instruction. This is in line with various authors (Amusan, 2014; McShane, 2019) who stated that there is a significant overlap between the skills necessary to be successful in teaching and leading in private schools and in public

schools. Teachers who had their specialties in science and technology-based courses displayed better topic-related pedagogical skills. Effective use of instructional time had a high predictive effect on teachers' pedagogical skills.

**Table 4.1:** Significance on the Relationship between ICT Indicators and Music Performance

| | **ME** | **VE** | **VSP** | **PhS** | **Overall** |
|---|---|---|---|---|---|
| EU | 0.637 | 0.531 | 0.553 | 0.476 | **0.608** |
| | < .001 | < .001 | < .001 | < .001 | **< .001** |
| TLM | 0.585 | 0.573 | 0.537 | 0.510 | **0.610** |
| | < .001 | < .001 | < .001 | < .001 | **< .001** |
| Eth | 0.646 | 0.636 | 0.614 | 0.552 | **0.677** |
| | < .001 | < .001 | < .001 | < .001 | **< .001** |
| SN | 0.584 | 0.545 | 0.551 | 0.487 | **0.600** |
| | < .001 | < .001 | < .001 | < .001 | **< .001** |
| Infra | 0.616 | 0.581 | 0.574 | 0.528 | **0.636** |
| | < .001 | < .001 | < .001 | < .001 | **< .001** |
| PD | 0.534 | 0.531 | 0.528 | 0.462 | **0.568** |
| | < .001 | < .001 | < .001 | < .001 | **< .001** |
| Acc | 0.517 | 0.501 | 0.496 | 0.477 | **0.551** |
| | < .001 | < .001 | < .001 | < .001 | **< .001** |
| Hea | 0.538 | 0.462 | 0.445 | 0.432 | **0.518** |
| | < .001 | < .001 | < .001 | < .001 | **< .001** |
| Pol | 0.529 | 0.469 | 0.507 | 0.458 | **0.543** |
| | < .001 | < .001 | < .001 | < .001 | **< .001** |
| ICTcc | 0.543 | 0.521 | 0.533 | 0.492 | **0.578** |
| | < .001 | < .001 | < .001 | < .001 | **< .001** |
| **Overall** | **0.732** | **0.684** | **0.681** | **0.623** | **0.752** |
| | **< .001** | **< .001** | **< .001** | **< .001** | **< .001** |

The correlation between the measures of ICT indicators and music performance revealed a significant relationship. This implies that ICT indicators are significantly correlated with student engagement. The findings of this study are in line with various authors (Karaseva, 2016) stating that teachers' music performance and levels of confidence in using ICT have been constantly found to be common enablers for prospective ICT integration. ICT indicators, particularly skills in handling various online resources, especially knowing that most search mechanisms and digital information resources are not created specifically for educational purposes like most collections online are fragmentary, and information often varies in quality, accuracy, and scope. Teachers' online search performance has a relationship with teachers' perceived music performance.

**Table 4.2:** Significance on the Relationship between ICT Indicators and Teaching Competency

| | **Know** | **Skill** | **Att** | **Overall** |
|---|---|---|---|---|
| TLM | 0.513 | 0.640 | 0.592 | **0.647** |
| | < .001 | < .001 | < .001 | **< .001** |
| Eth | 0.377 | 0.468 | 0.455 | **0.482** |
| | < .001 | < .001 | < .001 | **< .001** |
| SN | 0.449 | 0.614 | 0.571 | **0.606** |
| | < .001 | < .001 | < .001 | **< .001** |
| Infra | 0.460 | 0.541 | 0.448 | **0.539** |
| | < .001 | < .001 | < .001 | **< .001** |
| PD | 0.425 | 0.530 | 0.514 | **0.544** |
| | < .001 | < .001 | < .001 | **< .001** |
| Acc | 0.332 | 0.436 | 0.379 | **0.426** |
| | < .001 | < .001 | < .001 | **< .001** |
| Hea | 0.300 | 0.445 | 0.439 | **0.438** |
| | < .001 | < .001 | < .001 | **< .001** |
| Pol | 0.505 | 0.605 | 0.546 | **0.614** |
| | < .001 | < .001 | < .001 | **< .001** |
| ICTcc | 0.461 | 0.586 | 0.605 | **0.611** |
| | < .001 | < .001 | < .001 | **< .001** |
| **Overall** | **0.550** | **0.691** | **0.649** | **0.701** |
| | **< .001** | **< .001** | **< .001** | **< .001** |

The correlation between measures revealed that there is a significant relationship between ICT indicators and teaching competency. This implies that ICT indicators are positively correlated with teaching competency. The result of the study confirms various authors (Goalluth, 2016; Kreijns et al., 2013; Sivakumar, 2016) who mentioned that the positive effects of the use of ICT on students' learning as well as on teachers' competency and professional development are in line with the educational demands of the twenty-first-century knowledge society. In competency, it highlighted acquired skills, knowledge through learning, attitudes, and behaviors all attributed to quality standards learners may get if teachers are well-equipped and motivated in fostering learning. The skills in ICT have gained quintessential importance not only for education but also for employment and daily life use in the 21st century.

**Table 4.3:** Significance of the Relationship between Teaching Competency and Music Performance

| | **ME** | **VE** | **VSP** | **PhS** | **Overall** |
|---|---|---|---|---|---|
| Know | 0.453 | 0.393 | 0.424 | 0.357 | **0.450** |
| | < .001 | < .001 | < .001 | < .001 | **< .001** |
| Skill | 0.567 | 0.530 | 0.548 | 0.534 | **0.603** |
| | < .001 | < .001 | < .001 | < .001 | **< .001** |
| Att | 0.510 | 0.475 | 0.532 | 0.549 | **0.572** |
| | < .001 | < .001 | < .001 | < .001 | **< .001** |
| **Overall** | **0.568** | **0.519** | **0.557** | **0.532** | **0.602** |
| | **< .001** | **< .001** | **< .001** | **< .001** | **< .001** |

The correlation between the measures of teaching competency and music performance revealed a significant relationship. This implies that teaching competency is positively associated with music performance. This claim is in line with various authors (Ekinci, 2012; Wang & Wu, 2015) wherein improved teacher competency levels in technology use have been linked to increased music performance among students which, following a concept of social learning would in turn lead to an increased usage of technology. Therefore, it can be said that during the process of student training, attempts should be made not only to portray teaching competencies to students but also to improve their music performance beliefs.

**Table 5:** Regression results of the variables in the criteria of the presence of mediating effect

| | | | | 95% Confidence Interval | | | | |
|---|---|---|---|---|---|---|---|---|
| **Effect** | **Label** | **Estimate** | **SE** | **Lower** | **Upper** | **Z** | **p** | **% Mediation** |
| Indirect | a × b | 0.126 | 0.0458 | 0.0364 | 0.216 | 2.75 | 0.006 | 13.7 |
| Direct | c | 0.795 | 0.0645 | 0.6689 | 0.922 | 12.33 | < .001 | 86.3 |
| Total | c + a × b | 0.922 | 0.0466 | 0.8302 | 1.013 | 19.77 | < .001 | 100.0 |

The aim of this study is to contribute to the literature regarding the possible mediating variable for the relationship between ICT indicators and music performance. Specifically, teaching competency was investigated as a possible mediating variable that could explain the effect of ICT indicators on music performance. Full mediation is found in the study, and important and significant direct effects were presented that may help in the enhancement of the existing researches on ICT indicators and music performance. Significantly, the present study on the relationship between ICT indicators and music performance has found relevance to the study of Rogers (2003) wherein the process by which an innovation is communicated through certain channels and over time among the members of a social system. The process starts with knowledge of the first channel that represents characteristics of the decision-making unit by the ICT users in order to integrate the technology. Specifically, the current study has found that teaching competency is a positive and significant full mediator of ICT indicators and music performance.

The mediation analysis involved the path between ICT indicators and music performance, and the path between teaching competency and music performance. The findings confirmed the significant relationship between ICT indicators and music performance leading to support for one of the authors of this study Olga (2017) who declared that competency in education particularly in ICT is significant when it comes to students' music performances since high-level of teaching competency means high music performance for students. Thus, ICT indicators convey good teaching competency and music performance.

## 5. Recommendations

The researcher came up with recommendations based on the results of the study. On the high level of ICT indicators, the researcher recommends that the school management may conduct an inventory of existing equipment and paraphernalia and make sure that they are properly maintained, upgraded, and available for use by the students in their IT-related classes. It is recommended that a permanent IT staff may be assigned to the computer laboratories to assist the student in their class and in their desire to learn more and apply their learning in their class activities. A computer laboratory may be made installed or if the budget will not warrant it, an improvised area intended for a computer laboratory may be used for IT class-related activities. It is also recommended that a regular schedule (per class) may be prepared by the IT in charge for the conduct of orientation or reorientation to update the students on the technology.

In relation to this, all the teachers may be allowed to attend training and workshop about IT (on a scheduled basis) in order to equip the teachers with some innovations pertaining to IT and other applications/platforms and may be able to use them as an innovation in their teaching strategies. In addition, the school management may plan out a way to make sure that all teachers have personal laptops and gadgets to make easy their presentations and discussions in class. It may allow the teachers to apply for a loan (out of the school funds) to own a laptop which terms of payment may be affordable and deductible from the salaries of the teachers themselves.

On the high level of music performance, it is hereby recommended that existing PE activities may be continued/sustained such as the conduct of a class or school-wide cultural presentations to allow the students to showcase their talents and abilities in the field of music. Moreover, an inter-school competition may be attended/participated in by the students. This activity may not only be good for the students but also it is a way to market the school and show to the other schools or to the community the talents and abilities of the students. Also, if the school budget may warrant, the school may purchase some musical instruments or even some sports paraphernalia for use by the PE classes. A convenient place may be designed where the students can practice regularly their special event or skill or even for use as a training place in preparation for whatever competition the school has intended to join.

On the very high level of teaching competency, it is recommended that the teachers may continue to undertake whatever existing activities programmed for the year. Better still, there is still room for innovations or continuous quality improvement for whatever the teacher is doing for the good of the students. There may be an annual evaluation to be conducted for the activities the school has completed and that brainstorming as to the results of the evaluation may be conducted to ensure that the results are properly discussed and disseminated and plan for better activities in the future. The teachers may be allowed to attend seminars and training pertaining to the field they are teaching or attend a retooling seminar for some updates and innovations applicable to their classes.

On the results of the full mediating effect of teaching competency on the relationship between ICT indicators and music performance, it is hereby recommended that school management may always give importance to the teaching life of the teachers specifically on their request for some materials and equipment for the class use. The school management may regularly conduct dialogue or monthly meetings with the teachers and school staff to thresh out some issues, know some updates, and even a good opportunity to commend deserving teachers for a job well done. The students appreciate if their PE teacher teaches or performs well in PE activities, so in this regard, it is recommended that PE teachers may be allowed to further their professional development by encouraging them to enroll in their master's or doctorate degree in MAPEH in schools which may offer classes convenient to the teachers. Also, the teachers may be allowed to attend cultural presentations at the regional or national level and may be able to apply the learning in their own PE classes.

## 6. Conclusion

With consideration of the findings of the study, conclusions are drawn in this section. There is a high level of ICT indicators, a high level of music performance, and a very high level of teaching competency. There is a significant relationship between ICT indicators and music performance. There is also a significant relationship between ICT indicators and teaching competency, and a significant relationship between teaching competency and music performance. Also, there is a full mediation on the effect of teaching competency on the relationship between ICT indicators and music performance. The findings of the study clearly confirm the notion about the mediating role of teaching competency on the relationship between ICT indicators and music performance. The findings are supported by the anchor theory, the Diffusion of Innovations by Rogers (2003) wherein the main element in the diffusion of new ideas is an innovation, which is communicated through certain channels, over time, and among the members of a social system.

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**Conflict of Interest Statement**

The authors declare no conflicts of interest.

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