

Digital Tablets in the Music Classroom: A Study about the Academic Performance of students in the BYOD Context

FRANCISCO D. GUILLÉN-GÁMEZ¹, FRANCISCO J. ÁLVAREZ-GARCÍA²,
IRENE MALDONADO RODRÍGUEZ³

¹ Department of Research and Diagnostic Methods, Faculty of Education, Madrid Open University (UDIMA), Collado-Villalba, Madrid 28400, Spain. E-mail: franciscodavid.guillen@udima.es

² Department of didactics of musical and plastic expression, Faculty of Education, Pontificia University of Salamanca, C/ Henry Collet, 52-70, 37007, Salamanca. E-mail: fjalvarezga@upsa.es

³ Teacher in Music Education, International School Torrequebrada (CIT), Benalmádena, Málaga 29639, Spain Email: maldonado@colegiotorrequebrada.es

Abstract

This study assesses whether the use of digital tablets in the context of BYOD (Bring Your Own Device) produces an alteration in the academic performance of high school music students. The grades of high school students were analyzed and compared for two groups: experimental and control. The experimental group carried out the experiment using digital tablets, while a traditional methodology was used by the control group. The conclusions showed similar results regarding academic performance for a specific unit of the Music subject. Students who used their own digital devices obtained statistically similar results to students who followed a more conservative process (even slightly superior in some parameters). Furthermore, there were no significant differences regarding gender. The research concludes that digital tablets in the Music classroom are not a barrier for the academic performance of students, but rather a tool that helps in the teaching-learning process.

Keywords

Mobile Learning, digital tablets, ICT, Horizon Report, academic performance

1. Introduction

The Society of Information, driven by large developments and the widespread use of Information and Communication Technology (ICT) has produced vast that affect all areas of human activity, especially in the educational field (Ditzler, Hong and Strudler, 2016; Schweer and Sahl, 2017). Their effects imply a need to review a wide range of aspects of education, from the infrastructure and technological means used, to teaching and learning methods (Alvesson and Benner, 2016).

Horvat *et al.* (2015) determine that ICT brings people closer to the opportunity of establishing new environments and scenarios that help them to experiment with the process of significant learning. New educational trends, such as constructivism and connectivism, contemplate the use of ICT as a very useful tool, particularly in the research and selection of information, critical analysis and problem solving (Pinnelli and Fiorucci, 2015).

Due to the exponential evolution of new technologies and Web 2.0, a great variety of educational modes have been established in the teaching-learning process, such as E-Learning and m-Learning. Venkatesh, Croteau and Rabah (2014) define instructional uses

of ICT as a second generation in web history based on user communities. Furthermore, it offers a special range of services and internet applications, which are modified thanks to social participation on blogs, wikis, podcasts and virtual environments, as well as social networks.

There are several possibilities that ICT offers, particularly within the educational context (Bonds-Raacke and Raacke, 2008). For instance, mobile devices used for m-Learning are characterized by their easy operation, small size, processing capacity and immediate availability in the classroom, which offers plenty of educational possibilities and a personalized learning experience that is adapted to the individual characteristics of students at all levels (Georgiev, Georgieva and Smrikarov, 2004; Baran, 2014).

According to the consultant IDC1, from 2018, an increase in ICT sales is expected thanks to the creation of convertible tablets. In the last five years, the number of digital tablets sold has tripled. In fact, the sale of tablets has now overtaken the sale of personal computers and laptops. It is calculated that the market share of these new devices will increase from 16% in 2016 to 31% in 2020.

In order to carry out a process to use electronic devices to introduce ICT into an educational environment, the Horizon Report (Johnson *et al.*, 2015) proposes the politics of Bring Your Own Device (BYOD), which offers students the possibility of using their own electronic device in the classroom. BYOD is presented as a solution to the limited budget of educational institutions for financing these types of devices. Taking into consideration the fact that most students have a mobile device, this project aims to use these devices and employ them into a real context inside an educational community. In the same way, Pegrum, Oakley and Faulkner (2013) state that the use of tablets in educational learning is perhaps the fastest growing area in the field of ICT.

2. Related Works

Afreen (2014) states that in the BYOD context, students can easily access content from anywhere, and teachers can also share their knowledge with students inside or outside of the classrooms with ease. This concept is beneficial for students with all levels of comprehension. In addition, Armando, Costa and Merlo (2013) indicate that BYOD is the best opportunity for schools to become a digital learning environment immediately.

Given this information, this section provides a review of current literature related to the use of digital tablets inside the classroom.

Li and Pow (2011) from Hong Kong Baptist University carried out a comparison of student perceptions on the use of tablets. They used a sample of primary school students divided into two groups: control and experimental. The control group performed the set tasks over a period of two weeks without using any electronic devices, while the experimental group carried out the tasks using interactive tablets. The results showed that the acquisition of skills in the experimental group was significantly superior to the control group in relation to: (1) increasing motivation; (2) cognitive skills; and (3) learning strategies.

García-Moya (2016) carried out a similar study on the use of tablets in two primary schools in Spain. One of the schools had already started the process of using tablets in the classroom, while the other school did not use them. As general conclusions,

the author noted that the use of tablets: (1) allows access to a wide range of sources of information; (2) it helps collaboration between students; (3) is portable and multifunctional; (4) reinforces the autonomy and creativity of students; and (5) increases motivation, effectiveness and efficiency. Furthermore, between 70-80% of the students who used tablets said that it improved their ability to study and learn.

Wiley *et al.* (2016) carried out a study on the use of tablets (iPad) with students at a special education school (Trinidad, Spain) who had a wide range of intellectual and physical disabilities. A sample of 73 students was involved in the study, all of whom were aged between 4 and 43 years old. The project was supported by a 5-10 minute introductory session on how to use the iPad as a main tool of learning. The results were highly significant. Wiley *et al.* found that the regular use of tablets in the classroom improved the skill levels of each student, and showed a great potential for learning and independence in the classroom. Similarly, Rossing *et al.* (2012) from Indiana University (IUPUI) carried out an investigation on the use of iPads in the departments of Music, Communication, English, Physical Education and Tourism. They used a sample of 209 university students and concluded that iPads stimulate participation in course activities, improve learning and promote motivation.

Isci and Demir (2015) carried out a study with the aim of analyzing the use of tablets by teachers and professors as part of the Movement to Enhance Opportunities and Improve Technology (FATIH) project in Turkey. The objective was to equip all classrooms in the country with intelligent boards, internet access and tablets for each teacher and student. The investigation was based on a sample of six teachers who were interviewed for roughly two hours. The conclusions showed that many teachers did not use tablets due to technical problems and poor technological skills. These circumstances highlighted that the use of tablets was more beneficial amongst students.

With particular reference to the field of Music (the subject of the current study), Snodgrass (2013) carried out an investigation on the use of tablets in a Music class at a public university located in the rural area of North Carolina, America. The findings highlighted the importance of the integration of these devices in the classroom, allowing students the possibility of creating music files. Furthermore, students were able to create a website with the purpose of offering other students and music instructors their pieces and music records and obtaining useful information about music.

Reese, Bicheler and Robinson (2016) aimed to investigate the experiences of music teachers regarding the use of iPads with their students in a general music methods course at a public university in Northeastern United States. The results showed that teachers had some problems to resolve when they used these devices to create and teach music, which created an issue in terms of developing their TPACK (technological pedagogical and content knowledge) teaching. On the other hand, Ward (2009) affirmed that showing students how ICT can be used to compose pieces freely was beneficial in exploring the capacity of musical creation. However, both of these investigations do not go deeper into the influence of electronic devices on the scores of users.

Although the benefits of using tablets in different contexts of education have been verified in multiple studies, there are some factors that can affect the effectiveness of its use (Li, Yuen and Zou, 2015). For example, Bitner & Bitner (2002) and Ertmer and Ottenbreit-Leftwich (2010) state that students can perceive the integration of ICT as a barrier due to their fear of change, lack of learning, teaching beliefs or even due to the own characteristics of school. Similarly, Rossing *et al.* (2012) determined that the use of

tablets in the classroom can sometimes cause distraction. Following this, in spite of the great potential that these devices have for learning, very few empirical studies have investigated their benefits (Banister, 2010; Ifenthaler and Schweinbenz, 2013).

It is important to note that previous studies have not analyzed whether there is a variation in the academic performance of students before and after joining a BYOD school. This issue will be dealt with in this article. This means that if any of the aforementioned issues affect a student's perception of technology, they could develop learning in poor conditions and their academic performance could vary significantly. Therefore, the main purpose of the current study is to analyze the repercussions of the academic performance of students when mobile devices, such as tablets, are used in the subject of Music.

3. Method

The current study is based on the use of digital tablets in the European BEYOND project proposed by the Horizon report. The research was carried out with a group of high school students in order to ascertain whether the use of digital devices in the classroom could affect their performance in Music class.

Data was collected from two groups of twenty students (i.e. experimental group and control group). In the first group (experimental), electronic devices were used, while in the second group (control) these devices were not employed. The data was gathered, analyzed and compared in order to obtain results and conclusions in terms of whether the use of iPads could harm or help student performance.

This study was conducted by the Torrequebrada International School (CIT), a private school established in 2005 and located in Benalmadena (Malaga, Spain), with an annual enrolment of 650 students. Amongst its objectives, the CIT has the following two major aims (1) to change the teaching methodology to allow for open spaces, structured in different areas without traditional desks; and (2) to establish educative innovation, with the purpose of achieving quality, innovation and technology. An example of this drive for innovation can be seen in the creation of the position of "Leader of Educational Innovation" at Malaga University.

The use of electronic devices in the school is so important that teachers of basic subjects (Maths, English, and Music) use them to explore Web 2.0 strategies and possibilities that the use of iPads offers. For instance, Maths teachers use these electronic devices to study geometry or to carry out mathematical calculations through interactive applications (e.g. MathQuiz, GeometricPlane, iGeometry), while for English, teachers use audiobooks in order to improve their listening skills (e.g. Text Audio Books, A+English – Speak and Read).

In terms of this research, the experiment was carried out for just one unit within the Music class in the CIT: the classification of instruments in a classical orchestra. The main objectives were: (1) to classify and differentiate the different families or sections of the symphonic orchestra; (2) to get to know the main characteristics of some of the instruments of the symphonic orchestra; (3) to use auditory and visual methods to identify the instruments of the different instrumental families; (4) to get to know the technical classification of the musical instruments; and (5) to develop listening abilities and taste by listening to classical pieces.

In relation to the subject of Music, and specifically, the didactic unit explored in this research, before starting the learning and the activities corresponding to the use of iPads, the teacher was asked to install different applications on the iPads aimed at active learning, collaboration and/or student engagement. All students had their own electronic device, and all iPads had the same 2.0 applications. The school was responsible for the purchase of licenses for each software.

The didactic unit consisted of two weeks made up of five 60 minutes classes. For the purposes of this research, the control group used the same resources that they had always used in order to develop the content and the objectives methodologically: the text book (editorial Editex, course 1^o High School, didactic unit 5 “timbre”), stereo equipment and a computer with Internet connection/projector. However, the experimental group used their own digital tablets exclusively (one per student) in order to obtain the objectives and content of the unit. Devices were conveniently connected to the internet through Wi-Fi. Furthermore, students had the opportunity to use the devices at home in order to study and improve their skills and knowledge.

During each session, the participants were briefly introduced to the use of the iPad and its main characteristics of use. Following the short introduction, students were introduced to a “musical application” that had already been downloaded. Among the applications that the student used were *GarageBand* or *Noteflight* as sound and instrument editors, *Virtual Piano* and *Virtuous Piano* as digital simulators and *Monstermusic* for the creation of melodies or polyphonies. Instead, the control group worked with the same theoretical contents without the use of these apps.

After the five classes were carried out, the same exam was given to each group with the purpose of evaluating the acquisition of skills after having been exposed to the unit in two different methodological settings. The exam was divided into two sections: ten simple development questions and a practical listening recognition part where the student had to identify five instruments and classify them into their correct families.

It is necessary to point out that the teacher of the subject was in charge of imparting the didactic unit, while the researcher was another professor in charge of the scientific part of the article.

Design and Sample

The research was carried out with a non-probabilistic sample of 50 students in the second trimester of the year 2016-2017 in the Torrequebrada International School (Málaga, Spain). Students from both groups were registered in the first year of High School in the subject of Music. None of the students had a musical background on the contents of the didactic unit. Thus, all of them had roughly the same musical knowledge.

As was pointed out earlier, students were divided into two groups: A and B. Group A was the control group, where students used a more conservative methodology (text book, stereo equipment), while group B was the experimental group, who worked with the same objectives and musical skills, but only used one: a digital tablet with an internet connection. As the groups were not divided randomly, the design is quasi-experimental. The average age of the students in each group was 11-12 years old.

Data analysis

In order to carry out the analysis of the data that was obtained, the analysis was divided in three phases: descriptive analysis, normality test and hypothesis test. In the first step, the average, median, mode and standard deviation of each sample was analyzed. In the next step, the Kolmogorov-Smirnov test was carried out, while the third step consisted of designing the hypothesis. In this study, the following hypothesis was used: H0: no statistical differences exist between the knowledge of groups A and B; and H1: the knowledge of group A is statistically different to the knowledge of group B.

4. Results

Taking into consideration the fact that each group (control and experimental) sat two exams (theoretical and practical), the descriptive and statistical data will be shown in tables 1 and 2. These tables show the mean (M), the standard deviation (SD), normality test and the result of the statistical test applied.

Table 1 Descriptive statistical data of Control group

Control group (A)	Mean	SD	Normality test	t- Student	
				t	Sig.
Theoretical Exam	6.93	2.28	0.200	0.358	0.724
Practical Exam	6.78	1.38	0.159		

Table 2 Descriptive statistical data of Experimental group

Experimental Group (B)	Mean	SD	Normality test	t-Student	
				t	Sig.
Theoretical Exam	7.10	2.14	0.200	-1.002	0.329
Practical Exam	7.65	1.97	0.200		

From tables 1 and 2, it can be observed that there are no significant differences in each group regarding both exams. For instance, the mean of both exams in the control group is very similar ($M_T=6.93$; $M_P=6.78$). However, there is a greater difference in the standard deviation ($Sd_T=2.28$; $Sd_P=1.38$). Regarding the experimental group, students in both exams show a very similar mean ($M_T=7.10$; $M_P=7.65$) and standard deviation ($Sd_T=2.14$; $Sd_P=1.97$). The Kolmogorov-Smirnov normality test and the t-Student test show that there is no difference between the exams of each group ($sig_{control}=0.724$; $sig_{experimental}=0.329$).

Table 3 shows the descriptive data and the significance level of: (1) the difference in the exam for both groups, taking into consideration that it is made up of 20 points (10 points for the theoretical exam and 10 points for the practical exam); (2) the theoretical exam between both groups; and (3) the practical exam between both groups.

Table 3 Statistical analysis for both groups and for both exams

Exam	Group	Mean	SD	Normality test	t	Sig.
Total	Control	13.70	3.28	0.200	-1.009	0.319
	Experimental	14.75	3.30	0.200		
Theoretical (T)	Control	6.93	2.28	0.200	-0.250	0.804
	Experimental	7.10	2.14	0.200		
Practical (P)	Control	6.78	1.38	0.159	-1.624	0.113
	Experimental	7.65	1.97	0.200		

From the sum of the qualifications (maximum score 20 points), a difference of one point ($M_T = 13.70$; $M_P = 14.75$) can be observed in the total exam. This result shows a slight increase in the performance of the experimental group, which could indicate that the use of digital tablets in a Music classroom does not harm the academic performance, but rather helps to slightly improve performance.

Since the normality assumption was accepted, a t-test was performed. As the value of the statistical is $t = -1.009$ and its p-value is 0.319, there is no evidence to reject the H_0 . Thus, it is accepted that the mean of both groups of students does not present significant differences. This means that the use of tablets in the learning of Music students does not have a significant influence on their academic performance.

Regarding the theoretical and practical exams for both groups, happens similar trend can be noted. The means are superior in the experimental group. However, there is no significant differences between both groups for each type of exam ($Sig_T = 0.804$; $Sig_P = 0.113$).

Differences in the Use of Tablets According to Gender

With the purpose of further understanding how the use of digital tablets affects Music students, the sample was divided according to gender. Table 4, 5 and 6 show the descriptive data of central tendency measures and dispersion for both genders and for each group, taking into consideration the total qualification of the theoretical and the practical exams (20 points in total).

Table 4 Differences in the Control group according to gender

Control Group	Mean	SD	Normality test	t	Sig.
Female (F)	13.45	3.43	0.200	-0.362	0.722
Male (M)	14.00	3.26	0.200		

Regarding the control group, table 4 shows how the means ($M_F = 13.45$; $M_M = 14.00$) and the standard deviations ($Sd_F = 3.43$; $Sd_M = 3.26$) for both genders are very similar. Furthermore, no significant differences can be observed in the control group regarding gender ($Sig = 0.722$).

Table 5 Differences in the Experimental group according to gender

Experimental Group	Mean	SD	Normality test	t	Sig.
Female (F)	13.69	2.88	0.200	-1.187	0.251
Male (M)	15.46	3.49	0.200		

Regarding the experimental group (Table 5), boys show a higher mean than girls by almost two points in the exam ($M_F = 13.69$; $M_M = 15.46$). However, the t-test shows that there is no statistically significant difference in the mean between both genders (Sig. 0.251).

In addition, it is interesting to note whether there are any differences in gender when comparing both groups. If significant differences exist between females in the control and experimental groups, the same result is also likely for males.

Table 6 Differences between both groups according to gender

Control group Vs. Experimental group	Female (F)		Male (M)	
	t	Sig.	t	Sig.
	-0.156	0.878	-0.974	0.342

Table 6 shows how the academic performance of students does not have statistically significant differences between both groups if gender is taken into consideration (Sig._F = 0.878; Sig._M = 0.342).

Thus, overall, it can be concluded that the use of digital tablets does not affect the academic performance of students in both groups. Furthermore, there are no significant differences regarding gender.

5. Conclusions and Future Work

The main conclusion of the current research is, despite the fact that there were no major differences between the two groups, the use of tablets in the learning of Music students in the first course of ESO (High School) does bring about some improvement in performance when compared to students who do not use electronic devices. Thus, the use of mobile devices, particularly digital tablets in the subject of Music, allows teachers to carry out an innovative process in the transmission of musical skills without this interfering negatively on the academic performance of students. Surprisingly, the results showed that there were no significant performance differences in terms of gender in both groups and between both exams. However, this is something that could be explored further in future studies. Give these findings, this research corroborates the results obtained by Banister (2010) and Ifenthaler and Schweinbenz (2013), which affirmed the benefits of digital tablets in the classroom. Two main reasons support our argumentation:

(1) Mobile devices, such as tablets, use different types of means and resources (i.e. videos, interactive websites, musical pieces, specific music apps and different digital resources= that help teachers to carry out their work effectively; and

(2) Contrary to what is commonly believed, the use of mobile devices does not decrease the academic performance of students. However, the greatest limitation on the use of digital tablets on student's learning and academic performance is that a student may not use it appropriately due to its proximity or independence on the device (Rossing *et al.*, (2012) and Li *et al.*, 2015).

The current work can be extended in other more pragmatic areas of the Music classroom. Furthermore, the process and methodology of working in a theoretical area, such as the one used in this research, could be used in other practical Music units, such as instrumental training, body expression and auditory acuity. Thus, it could be interesting to observe how the use of digital tablets as an alternative learning method could benefit these three particular fields in terms of the teaching/learning process and how these specific competences could be transferred to the context of musical education.

In addition, it is planned to expand this research by analyzing and comparing the academic performance of students in other subjects, such as Maths or English. The use of digital tablets in these types of subjects could improve student learning and performance with subject-related apps. Moreover, these experiments are planned to be enhanced with more courses (e.g. other educational stages) and other learners to corroborate the results of the current experience.

References

- Afreen, R. (2014). Bring your own device (BYOD) in higher education: opportunities and challenges. *International Journal of Emerging Trends & Technology in Computer Science*, 3(1), 233-236.
- Alvesson, M., & Benner, M. (2016). Higher Education in the Knowledge Society: Miracle or Mirage?. In *Multi-level governance in universities* (pp. 75-91). Springer International Publishing.
- Armando, A., Costa, G., & Merlo, A. (2013, March). Bring your own device, securely. In *Proceedings of the 28th Annual ACM Symposium on Applied Computing* (pp. 1852-1858). ACM.
- Banister, S. (2010). Integrating the iPod Touch in K-12 education: Visions and vices. *Computers in the Schools*, 27(2), 121-131.
- Baran, E. (2014). A review of research on mobile learning in teacher education. *Educational Technology & Society*, 17(4), 17-32.
- Bell, B. S., & Federman, J. E. (2013). E-learning in Postsecondary Education. *The Future of Children*, 23(1), 165-185.
- Bitner, N., & Bitner, J. (2002). Integrating technology into the classroom: Eight keys to success. *Journal of technology and teacher education*, 10 (1), 95-100.
- Bonds-Raacke, J. M., & Raacke, J. D. (2008). Using Tablet PCs in the classroom: an investigation of students' expectations and reactions. *Journal of Instructional Psychology*, 35(3), 235-240.
- Ditzler, C., Hong, E., & Strudler, N. (2016). How Tablets Are Utilized in the Classroom. *Journal of Research on Technology in Education*, 48(3), 181-193.
- Ertmer, P. A., & Ottenbreit-Leftwich, A. T. (2010). Teacher technology change: How knowledge, confidence, beliefs, and culture intersect. *Journal of research on Technology in Education*, 42(3), 255-284.
- Fernández-López, Á., Rodríguez-Fórtiz, M. J., Rodríguez-Almendros, M. L., & Martínez-Segura, M. J. (2013). Mobile learning technology based on iOS devices to support students with special education needs. *Computers & Education*, 61, 77-90.
- Telefónica Foundation (2015). The society of the information in Spain. <http://www.fundaciontelefonica.com>. Accessed on 14th March 2017.

- García-Moya, I. (2016). *Tabletas en Primaria: La visión del alumno*. (Degree project, International University of La Rioja, Spain. Education Faculty).
- Georgiev, T., Georgieva, E., & Smrikarov, A. (2004, June). M-learning-a New Stage of E-Learning. In *International conference on computer systems and technologies-CompSysTech* (Vol. 4, No. 28, pp. 1-4).
- Horvat, A., Dobrota, M., Krsmanovic, M., & Cudanov, M. (2015). Student perception of Moodle learning management system: a satisfaction and significance analysis. *Interactive Learning Environments*, 23(4), 515-527.
- Ifenthaler, D., & Schweinbenz, V. (2013, January). Students' acceptance of tablet-PCs in the classroom. In *AERA 2013: Education and poverty: theory, research, policy, and praxis: Proceedings of the American Education Research Association 2013 annual meeting* (pp. 1-1). American Education Research Association.
- Isci, T. G., & Demir, S. B. (2015). The Use of Tablets Distributed within the Scope of FATIİH Project for Education in Turkey (Is FATIİH Project a Fiasco or a Technological Revolution?). *Universal Journal of Educational Research*, 3(7), 442-450.
- Johnson, L., Adams Becker, S., Estrada, V., & Freeman, A. (2015). *The NMC Horizon Report: 2015 Museum Edition*. New Media Consortium. 6101 West Courtyard Drive Building One Suite 100, Austin, TX 78730.
- Li, S. C., & Pow, J. C. (2011). Affordance of deep infusion of one-to-one tablet-PCs into and beyond classroom. *International Journal of Instructional Media*, 38(4), 319-326.
- Li, X., Yuen, A. H., & Zou, W. (2015). Understanding the Obstacles of Using Tablet as a Learning Tool in Primary Schools from Teachers' Perceptions. In *New Media, Knowledge Practices and Multiliteracies* (pp. 43-51). Springer Singapore.
- Pegrum, M., Oakley, G., & Faulkner, R. (2013). Schools going mobile: A study of the adoption of mobile handheld technologies in Western Australian independent schools. *Australasian Journal of Educational Technology*, 29(1), 66-81.
- Pinnelli, S., & Fiorucci, A. (2015). University and Flipped Learning TIC & DIL Project: Framework and Design. *International Association for Development of the Information Society*, pp. 217-224.
- Reese, J. A., Bicheler, R., & Robinson, C. (2016). Field Experiences Using iPads: Impact of Experience on Preservice Teachers' Beliefs. *Journal of Music Teacher Education*, 26(1), 96-111.
- Rossing, J. P., Miller, W. M., Cecil, A. K., & Stamper, S. E. (2012). iLearning: The Future of Higher Education? Student Perceptions on Learning with Mobile Tablets. *Journal of the Scholarship of Teaching and Learning*, 12(2), 1-26.
- Schweer, D., & Sahl, J. C. (2017). The Digital Transformation of Industry—The Benefit for Germany. In *The Drivers of Digital Transformation* (pp. 23-31). Springer International Publishing.
- Snodgrass, J. S. (2013). Drawing musical conclusions: Integration of the tablet PC into the music classroom. *Journal of Technology in Music Learning*, 5(1), 70-87.
- Venkatesh, V., Croteau, A. M., & Rabah, J. (2014, January). Perceptions of effectiveness of instructional uses of technology in higher education in an era of Web 2.0. In *2014 47th Hawaii International Conference on System Sciences* (pp. 110-119). IEEE.
- Ward, C. J. (2009). Musical exploration using ICT in the middle and secondary school classroom. *International Journal of Music Education*, 27(2), 154-168.
- Wiley, B., Cameron, D., Gulati, S., & Hogg, A. (2016). Exploring the use of tablets (iPads) with children and young adults with disabilities in Trinidad. *Disability and Rehabilitation: Assistive Technology*, 11(1), 32-37.