TEACHERS FACTORS AS PREDICTORS OF INFORMATION COMMUNICATION TECHNOLOGY INTEGRATION IN THE TEACHING OF PHYSICAL EDUCATION

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Abstract

The use of Information and Communication Technology (ICT) in modern-day teaching has helped to improve the quality of teaching deliverables through a wide range of software and input devices. Deploying this technology to Physical Education (PE) teaching is fraught with issues. This study, therefore, examined teachers' factors as predictors of ICT integration in the teaching of PE among secondary schools in Eti-Osa Local Government Area of Lagos State. The study was descriptive and quantitative. Participants were 74 junior secondary education PE teachers purposively selected from public and private junior secondary schools. A self-developed and validated research instrument with a reliability coefficient of 0.83 was used to collect data for the study. Results showed that teacher factors of access to technological resources (β=.105; Beta=.055; t=2.342; *p< 0.05) and attitude (β=.023; Beta=.047; t=1.442; *p< 0.05) are significant predictors of ICT integration in the teaching of PE; while teachers' exposure (β=.141; Beta=.032; t=1.915; p< 0.05) and competence (β=.416; Beta=.044; t=1.890; p< 0.05) are not significant predictors. The study, therefore, concluded that teacher factors of access to technological resources and attitude are significant predictors of ICT integration in the teaching of PE. It recommended that school administrators and managers should ensure that technological resources are made more accessible to PE teachers; and to sustain teachers' attitude, school administrators should, from time to time, provide incentives in form of appraisals to teachers whenever they successfully integrate ICT into their lessons.

Keywords: ICT, PE, Teacher's Attitude, Teacher's Competence, Technological Resources, Technological Training

Introduction

The rapid development of emerging technologies such as web and other assistive technology has increasingly attracted the attention of educators. How information and communication technology (ICT) is deployed to teaching has influenced the way educators design and develop instruction, and assess their students in schools (Prajapati, 2012). Through the innovations brought by ICT, the systems of communication, learning resources, lesson ideas, and professional development in the educational system have all changed. These innovations consist of computer programs, internet programs, or other assistive technologies, digital and communicative tools; and by extension, have facilitated creativity and learning. Over the years, different styles and practices have evolved through different forms of technological innovations that have been used by classroom teachers (Wozney, Venkatesh & Abrami, 2006; Gibbone, Rukavina & Silverman, 2010).

Technology has great potentials, yet an area in which it has not been fully deployed for use is in physical education (PE) in developing nations like Nigeria. Although discipline-specific technology has been developed, generally, technology inclusion has not become commonly used in PE due to limitations like lack of training, personal comfort levels, availability of equipment, and space and time (Villalba, González-Rivera, & Díaz-Pulido, 2017). PE teachers can deploy technology into their

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deliveries through a variety of instructional approaches. According to Posner (2004, as cited in Gibbone et al, 2010), preparing, generating, administering, and reporting information such as fitness scores, class participation, or motor skill rubric grades for both students and teachers are completed more efficiently by deploying ICT to these activities. Subject teachers can make the use of innovations in word processing and desktop publishing to teach content areas like newsletters, information packets, and student portfolios.

PE focuses on the physical development of the human body with emphasis on health, physical welfare and recreation. PE is that phase of the total process of education concerned with the development and utilization of the individual's voluntary purposeful movement capabilities and which is directly related to mental, emotional, social and physical responses (Alagbu, 2011). Alla and Ajibua (2012) noted that PE is that phase of the total process of education that is concerned with the development and utilization of the individual's voluntary purposeful movement capabilities and which is directly related to mental, emotional, social and physical responses. These can be achieved effectively by the integration of technology into the mode of delivering instruction in PE.

ICT can support new instructional approaches and make hard-to-implement instructional methods such as simulation or cooperative learning more feasible (Roblyer, Edwards, & Havriluk, 2004). If effectively used, ICT has the potential of improving student learning outcomes and effectiveness (Wang & Woo, 2007). Integration has a sense of completeness or wholeness (Buabeng-Andoh, 2012), by which all essential elements of a system are seamlessly combined to make a whole. In a properly crafted ICT integrated lesson, crucial educational components such as content and pedagogy are moulded into one entity. As a result, the quality of the lesson could be diminished if the ICT ingredients were taken away from it.

ICT integration is broadly viewed as a process of using any ICT tool to enhance students' learning. It is more of a process rather than a product. The primary factor that influences the effectiveness of learning is not the availability of technology, but the pedagogical design for effective use of ICT (Friedman, 2006). Effective ICT integration into the learning process has the potential of engaging and arresting the attention of learners. For instance, using multimedia to demonstrate a particular movement action in a gymnastics lesson can motivate and challenge students and hence develop their problem-solving skills. Such interaction makes the learning process more interactive and learners more active and engaged (Wang & Woo, 2007).

ICT plays significant roles in the teaching-learning process of PE. As a tool, the use of ICT by learners offers enormous opportunities for learning in PE. Hence, developing an ICT culture is an important part of the process of integrating ICT into a school's teaching and learning programs. In PE, ICT is deployed as a tool for achieving learning objectives (Prajapati, 2012). There are numerous ICT applications, tools and devices that can be deployed for teaching in PE. These applications and tools include cameras (digital cameras, camcorders, mobile phone cameras, spy cameras, etc.), motion analysis software, film editing tools, portable media players (cd players, mobile phones, iPods), interactive whiteboards –IWBs, voice projection systems, game consoles, dance mat systems, timers and pedometers, podcasting, video conferencing, YouTube, e-mails, Microsoft office tools (PowerPoint, word, outlook, excel, OneNote).

Integrating ICT into the teaching-learning process of PE is largely dependent on the teacher factor. Teachers remain central to the learning process and regular support is essential to professional development which can be facilitated through the use of ICT. To make ICT training more attractive to teachers, a variety of incentives can be used, including certification, professional advancement, pay increases, formal and informal recognition at the school and community levels and among peers.

Teachers' use of ICT and its integration into their professional practice could be predicted by many factors. The factors of attitude, quality and quantity of technology training are strong predictors of technology use (Vannatta & Fordham, 2004). Murugan, Ravi, and Surianarayanan (2012) also confirmed that the use of computers, particularly by secondary school teachers, are significantly related to technical proficiency and frequency of professional application by teachers. However, teachers are constrained by some factors such as access to equipment, training, personal comfort levels, availability of equipment, and time.

There is an increasing awareness of the benefits of ICT use in Nigerian schools as more of them, are gradually integrating ICT into instructional delivery and curriculum implantation. However, despite this level of deployment of ICT for teaching, PE teachers in many local government areas in Lagos State have not fully embraced the integration of this technology in the teaching of the subject due to teachers' factors and disposition to ICT. Hence this study examined the factors predicting the integration of ICT in the teaching of PE among secondary schools in Eti-Osa local government area of Lagos State.

Research Purpose

The purpose of the study was to examine the factors predicting the integration of ICT in the teaching of PE among secondary schools in Eti-Osa local government area of Lagos State

Research Question

What are the factors that predict PE teacher's ICT integration in the teaching of PE in Etiosa Local Government Area of Lagos State?

Research Hypothesis

There is no significant relationship among the factors that predicts ICT integration in the teaching of PE in Etiosa Local Government Area of Lagos State.

Methods

The descriptive research design was adopted in carrying out this study to establish the association of the variables of interest with the integration of ICT in the teaching of PE. This method was used because the situation had already existed and researchers only collected the data on the variables of interest. The population comprised of 74 PE teachers in 12 public and 52 private junior secondary schools in Eti-Osa local government area of Lagos State. As teachers of the subject, they are considered relevant to the objective of this study as they are the major implementers of the PE curriculum who would deploy the ICT technology in the teaching of the subject.

Sample and Sampling Technique

The sample for this study comprised of seventy-four (74) PE teachers purposively selected from all the public and private junior secondary schools in the Eti-Osa Local Government Area of Lagos State, as they have the particular characteristics of being involved in the teaching of PE in all the public and private junior secondary schools in the local government area.

Instrumentation

A self-developed questionnaire was employed to collect data from the respondents. The research instrument was divided into two sections. Section A of the questionnaire was designed to collect socio-demographic information about the respondents, while Section B which has 28 items, was sub-divided into four parts, based on the variables of interest. Each part is structured on a 4-point Likert type scale scoring to gather responses from the respondents. The validity of the instrument was ensured using the Delphi method (4 university teachers who are experts in ICT), an expert panel (5 specialists), and a pilot study (20 PE teachers). To achieve the study's objectives, the instrument was analysed. A Likert type scale of 1-4 was used. Cronbach's alpha for this item (0.9) was used as a reliability criterion and showed excellent internal consistency.

The questionnaire was administered to twenty (20) PE teachers who were not in the same local government area. Cronbach alpha correlation was used to determine the reliability of the instrument. The result yielded a coefficient of 0.83. This value was considered reliable enough for the objective of this study.

Procedure and Data Analysis

Printed copies of the questionnaire were administered with 8 research assistants and over three (3) weeks to all the respondents. Respondents were encouraged to complete the questionnaire on the spot to facilitate easy collection and maximize retrieval rate. A total of ninety-two (92) copies of the questionnaire were administered across all the junior secondary schools but only sixty-four (74) copies were retrieved in usable form, representing 80.4% return rate. Data collected was analyzed using IBM Statistical Package for Social Sciences version 21 for windows. Descriptive statistics of frequency counts and percentages were used to describe the demographic variables of respondents. Inferential statistics of Pearson's product-moment correlation was used to determine the relationship of the teachers' factors and integration of ICT into the teaching of PE, while multiple regression was used to determine the predictive effect of the independent variables on the integration of ICT into the teaching of PE.

Results

Analysis of the demographic variables of respondents revealed that 55 were men (74.3%) and 19 were women (25.7%), with age groups ranging between 20-29 years old (n=35; 47.3%), 30-39 years old (n=17; 23%), 40-49 years old (n=10, 13.5%), and 50-59 years old (n=12; 16.2%). None of the respondents was above 59 years, while the average age was 33.7 and the standard deviation 7.65. Participants' years of experience ranged between 2years to 25years, with 48 (64.9%) of respondents having less than 10 years of experience, 20 (27.0%) having between 11 – 20 years of experience, 6 (8.1%) having between 21 – 30 years of experience. No respondent had over 25years of experience.

Table 1: Summary of Pearson's correlation analysis showing the relationship of the teachers' factors and ICT integration in the teaching of PE

Variables	N	Mean	SD	r	Probability	Remark
Teachers' access	74	21.96	3.94	.33	.000	Sig.
Teachers' exposure	74	24.47	3.01	.67	.001	Sig.
Teachers' attitude	74	22.24	5.47	.59	.000	Sig.
Teachers' competence	74	21.33	4.40	.24	.003	Sig.
ICT Integration	74	26.47	3.01			

*$p < 0.05$; df = 73

Table 1 presents the summary of Pearson's correlation analysis showing the relationship of the teachers' factors and ICT integration in the teaching of PE. Results show that all the teachers' factors are significantly related to the integration of ICT into the teaching of PE.

Table 2: Summary of multiple regression analysis showing the independent effect of each teacher factor on the integration of ICT in the teaching of PE

Teachers' factors	β	Std Error	T	Sig	Multiple R	Change in R^2	F-ratio value	Sig
Teachers' access	.105	.055	2.342	.032*	.057	.044	4.24	0.03*
Teachers' exposure	.141	.032	1.915	.059	.014	.001	0.96	0.31
Teachers' attitude	.023	.047	1.442	.047*	.482	.475	6.13	0.00*
Teachers' competence	.416	.044	1.890	.063	.018	.004	1.30	0.27

*p< 0.05

Table 2 presents a summary of the regression analysis of the independent effect of each of the teachers' factor on the integration of ICT in the teaching of PE. Results showed that teacher factors of access to technological resources (ß=.105; Beta=.055; t=2.342; *p< 0.05) and attitude (ß=.023; Beta=.047; t=1.442; *p< 0.05) are significant predictors of ICT integration in the teaching of PE; while teachers' exposure (ß=.141; Beta=.032; t=1.915; p< 0.05) and competence (ß=.416; Beta=.044; t=1.890; p< 0.05) are not significant predictors. Therefore, only two teachers' factors (teachers' access and teachers' attitude) significantly and independently predicted integration of ICT in the teaching of PE. It could also be deduced from the analyses that the four independent variables when taken together, significantly accounted for 52.4% of the total variance in the integration of ICT in the teaching of PE. This is an indication that the potency of a combination of the teachers' factors in determining the integration of ICT in the teaching of PE could not have occurred by chance.

The relative contribution of each independent variable of teachers' factors to the determination of integration of ICT into the teaching of PE is also reflected in Table 2. It shows that teachers' attitude has the strongest independent variance determination of 47.5% in the integration of ICT in teaching of PE while teachers' exposure has the weakest variance determination of 0.1%. Only teachers' access and teachers' attitude have significant F-value.

Discussion of Findings

This study made some findings. The first is that teachers' access to technological resources significantly predicts the integration of ICT in PE teaching. This finding supports that of Yildirim (2007) that access to technological resources is one of the effective ways to teachers' pedagogical use of ICT in teaching. This further emphasizes the need for PE teachers to have access to technological resources. This finding is also in line with that of Gibbone et al. (2010) that accessibility to computers and the internet either at home or at their workplaces contributes to the efficiency of majority of PE teachers. This finding could be explained from the perspective that it is only when ICT resources are available that teachers can access and use them. Therefore, access to these resources is vital to the successful integration of ICT into the teaching of PE.

This study also found that teachers' exposure to technological training does not significantly predict the integration of ICT in the teaching of PE. This finding is in disagreement with Murugan et al. (2012) that technology training and professional development are among the greatest determinants of

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successful ICT integration. The finding of the present study is surprising as training enhances competency on the job. It is clear that for the PE teacher to be successful in integrating ICT into the lesson delivery, one must be exposed to some form of training on that particular technology. Technical mastery of technology skills is not a sufficient precondition for successful integration of ICT in teaching as teachers require extensive, on-going exposure to ICT to be able to evaluate and select the most appropriate resources (Goktas, Yildirim, & Yildirim, 2009). However, a possible explanation for this finding is that PE teachers might not give high premium to training since most schools do not organize ICT training for them nor have the technological resources to get the teachers exposed to.

The finding of this study also reveals that teachers' attitude significantly predicts the integration of ICT in the teaching of PE. This supports the findings of Gibbone et al. (2010) that when PE teachers acknowledged a willing attitude towards the use of technology for the teaching of PE, there is a greater inclination to use technology. This finding also supports those of Villalba et al. (2017) that individual's use of digital technologies or electronic devices during training and skill acquisition can only be predicated on a positive attitude towards its use. If teachers' attitudes toward the use of educational technology are positive, then they can easily provide useful insight and foster ICT integration into teaching and learning processes (Buabeng-Andoh, 2012; Tondeur, van Braak, & Valcke, 2007)

In respect to teachers' competence, the finding from this study reveals that teachers' competence does not significantly predict the integration of ICT in the teaching of PE. Although Wozney et al. (2006), Peralta and Costa (2007), Goktas et al. (2009), and Juniu (2011) have closely linked teacher's competence to ICT integration in teaching, the present finding contradicts their separate findings that teacher's technology competence significantly predicts the integration of ICT in teaching PE. A possible explanation is that other factors of the teachers might have accounted for this strange finding.

Conclusions

This study examined four predictors of ICT integration in the teaching of PE. Based on the results and findings, the study concluded that teacher factors of access to technological resources and attitude are significant predictors of ICT integration in the teaching of PE. It also concluded that teachers' exposure and competence are not significant predictors of ICT integration in the teaching of PE.

Recommendation

Given these conclusions, it is recommended that school administrators and managers should ensure that technological resources are made more accessible to PE teachers in their schools. Accessibility increases the likelihood that teachers will adopt or integrate them into their lessons. To sustain the teachers' attitude, school administrators should, from time to time, provide incentives in the form of appraisals to teachers whenever they successfully integrate ICT into their lessons. Periodic training that is subject-specific and effective should also be organized to sustain the teachers' attitude.

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