

GENDER DIVERGENCE AND EDUCATIONAL TECHNOLOGY INTEGRATION IN SECONDARY SCHOOLS IN OGUN STATE

¹Ezekiel E. I. & ²Ezekiel L. O.

¹Department of Business Administration and Management, Federal Polytechnic, Ilaro, Ogun State.

²Department of Business Administration, University of Benin, Benin City.

evelyn.ezekiel@federalpolyilaro.edu.ng & lawrence.ezekiel@mgtsci.uniben.edu

ABSTRACT

The introduction of ICT into the educational sector shaped new social stereotypes and gender inequalities. The aim of the study is to determine whether there is a significant relationship between gender and educational technology integration in secondary schools in Ogun State and to determine male and female teachers' perceived usefulness of educational technology. The study is a cross-sectional research and adopted a survey research approach. 50 schools were selected across Ogun State using convenience sampling. The schools selected are mostly situated in urban regions where technology (ICT) is believed to be popular. A structured questionnaire was used as data gathering instrument. Data gathered were analyzed through cross tabulations and chi-square using SPSS version –21. Results showed that there is no significant relationship between gender and the use of computer software /games and internet/social media in secondary schools in Ogun State. The use of computer based educational technology by secondary school teachers in Ogun State is evenly distributed between male and female teachers. Furthermore, the perceived usefulness of computer games/software is higher among female teachers, while the perceived usefulness of internet/social media is higher among the male teachers. This shows that female teachers have improved over the years in integrating educational technology as compared to previous relevant studies. The study therefore recommended that female teachers should be further encouraged in integrating educational technology in their pedagogy, most especially in the area of internet and that secondary school owners including teachers should take educational technology integration a bit further.

Keywords: Computer games/software, Educational technology, Gender, Internet/social media, Technology.

1.0: INTRODUCTION

Technological applications in education have developed in various ways. Computer programs and animations are leading examples of using technological equipment in education (Bamidele & Ayotola, 2013). The issue of integration of technology among teachers in education settings is gaining momentum (Deutsch, 2010). Over the last two decades, computer technology has been shifting many aspects of education including administration both at the lower and higher levels, recruitment, and the manner of instruction and learning. Information Communication Technologies (ICTs) are widely seen as having the potential to contribute positively to educational growth and development and to advance the livelihoods and quality of life of individuals and schools (Chepkonga, 2015). It is inescapable to use these novel technologies such as the internet, video or teleconferencing, mobile phones, IPADs, IPODs, Interactive TV, satellite broadcast, Audio and Video, Slides, CDs, computers etc. to decipher problems in education because the development of technology from day to day is providing improved substitutions to methods by which teaching and learning were hitherto carried out which unvaryingly is reducing the hitches encountered in education (Ahmet & Ahmet, 2008). The success of technology-based instruction practice for learning is largely due to its potential to incorporate different types of media (such as sound, video, graphics, text, etc.) and delivered in several forms including collaboration, interactive, and simulation. Majority of this teaching tool possesses the ability to show the physical phenomenon in a way that students can visualize in a three dimensional form. With these technologies, learning nowadays can be facilitated through different methods other than the traditional teaching and learning method. Such methods include mobile learning, distant learning, virtual learning and computer-based learning, among others (Bamidele & Ayotola 2013). The espousal of technology at secondary and post-secondary institutions has therefore become a vital research topic (Zhou & Xu, 2007).

The argument over the gender variance related to technology adoption started in the 1980s, and it still perseveres in the present day. Many scholars have reexamined this issue and many are persistently doing so. There is a budding interest on the impact of possible gender divergence in technology reception, which emphasizes the study of gender

and novel technologies in education as a significant research theme (Teo, Fan & Du, 2015). The introduction of ICT into the educational sector shaped new social stereotypes and gender inequalities (Markauskaite, 2005). According to Markauskaite, the innovation of the computer has been viewed as a male realm. Volman and Eck (2001) argue that longstanding stereotypic gender differences in attitudes and achievements that hitherto existed in mathematics and technological disciplines were extrapolated to the area of ICT. Several research reviews state that males are more interested in ICT than females and are regular users of computers with more optimistic attitudes about computers and consequently outpace females in ICT mastery (Shapka & Ferrari, 2003).

Technology is growing at a geometric rate and today, educational technology has become more popular than ever (Chepkonga, 2015). Furthermore, study on gender and educational technology integration is not entirely new in academia. Some studies about teacher gender and technology use has indicated the fact that female teachers tend to have infrequent use of computers and/or technology in their pedagogy than their male colleagues, because of their low interest level and their skill (Kay, 2006; Volman & Eck, 2001; Wozney, Venkatesh, & Abrami, 2006; Zhou and Xu, 2007). However, from extant literature review, scarce research evidence exists concerning gender and educational technology integration in Nigerian secondary schools. Hence, the study intends to fill the gap.

The aim of the study is to determine whether there is a significant relationship between gender and educational technology integration in secondary schools in Ogun State and to determine male and female teachers' perceived usefulness of educational technology. The specific objectives are as follows:

Firstly the study determine whether there is a significant relationship between gender and the use of computer software/games and the use of internet/social media in secondary schools in Ogun State.

The research hypothesis for the study is stated as follows:

- Ho₁: There is no significant relationship between gender and the use of computer software/games in secondary schools in Ogun State.
- Ho₂: There is no significant relationship between gender and the use of internet/social media in secondary schools in Ogun State.

However, the study is delimited to secondary school teachers in Ogun state. The research borders on gender and educational technology integration secondary schools in Ogun state. The study is a cross-sectional study and limited to 2019. No time series analysis was considered. The study is intended to show gender-technology distribution in secondary schools in Ogun State and determine which gender, if any, needs improvement on educational technology integration towards development.

2.0: LITERATURE REVIEW

2.1: Concept of Educational Technology

The word technology is derived from the Greek word “techno” which means the willingness, skills, knowledge of the way, rule, tools and “logos” which means science, word, learning, mental state (Stosic, 2015). Educational technology is a methodical and organized procedure of applying current technology to advance the quality of education. It can also be referred to as a systematic way of conceptualizing the execution and appraisal of the educational process such as learning and teaching. It comprises of instructional resources, methods and organization of work and relationships such as the behavior of all partakers in the educational process. The term “teaching resources” is frequently used, though they are not synonymous (Potkonjak & Pijanovic, 1996). Educational technology incudes three domains of practice namely: technology as a tutor (computer gives instructions and guides the student), technology as a teaching device and technology as a learning tool. With the application of educational technology, students can independently advance in understanding teaching materials, choose the speed of work and repeat the material that is not satisfactorily clear. Collaborative multimedia content provides a boundless advantage of modern learning over traditional learning. With the application of educational technology we get feedback between the teacher and the student (Stosic, 2015).

2.2: Theoretical Perspectives on Educational Technology Integration

Technology integration theories have been discussed at great length in literature, but gender matters influencing teachers' technology integration in schools is of current curiosity to education scholars (Teo, Fan & Du, 2015). According to Earle (2002), “wholeness” is an imperative concept and condition for technology integration. Earle

posited that when all of the constituents of the system are linked together, the system becomes a “whole”. Simply offering websites or technology tools, such as multimedia presentation, to students to view and learn on their own would not be considered as integrating technology. The teacher would need to use their inventive pedagogical skills to incorporate technology. Similarly, Williams (2003) defined the integration of technology as engaging technology as an instructional tool to sustain learning and instruction, and technology integration becomes realism when information and communication technology (ICT) have been incorporated into classroom instruction and learning activities. Nonetheless, various factors, such as educational level and experience, experience with technology in educational settings, school teacher’s gender and age, and their views and conduct toward computing technology and its use, can influence the integration of technology into the classroom atmosphere (Schiller, 2003).

The issue of gender variances in the use of technology in the classroom has emerged in a number of research investigations. Some studies about teacher gender and technology use have alluded to the fact that female teachers tend to have infrequent use of ICT in their pedagogy than their male colleagues, because of their interest level and their skill (Kay, 2006; Volman & Eck, 200; Wozney *et al.*, 2006). In a research study on technology mastery and technology experience, Markauskaite (2006) examined gender differences, and found noteworthy gender differences (in favor of the male group) in their ability to work with technology in assignments. Jamieson-Proctor, Burnett, Finger, and Watson (2006) revealed that male teachers were integrating technology into their pedagogy much more than the female teachers. For an improved understanding about how gender issues may influence technology integration in schools, there is the need to comprehend potential gender variances on several important measurements of technology acceptance such as attitude, perceived usefulness, perceived ease of use, and intention for using technology among others.

2.3: Empirical Review

Tao *et al.* (2015) carried out a study on technology acceptance among pre-service teachers: does gender matter? The study was carried out in China. This study examined possible gender differences in pre-service teachers’ perceived acceptance of technology in their professional work under the framework of the technology acceptance model (TAM). Based on a sample of pre-service teachers, a series of progressively more stringent measurement invariance tests (configural, metric, and scalar invariances, as well as latent mean difference) were conducted. Practically, the findings revealed that, while the gender groups showed no statistical difference on perceived usefulness, attitudes toward technology, intention to use technology, female pre-service teachers had lower scores on perceived ease of use, suggesting that technology use is more challenging for female pre-service teachers than for their male counterparts.

Chepkonga (2015) carried out a study on relationship between principals’ gender and ICT integration in management of public secondary schools, Nairobi, Kenya. The purpose of this study was to find out whether there exists a relationship between the principals gender and ICT integration in management of public secondary schools in Kenya. Cross-sectional survey design was used in Nairobi County where quantitative research strategy was applied for the collection of data using questionnaires. The target population comprised of 75 secondary schools in Nairobi County at the time of data collection. Simple Random sampling was used to select the public secondary schools with 7(10%) participating in the pilot study. Data collected by questionnaires from 68 principals were analyzed using Pearson’s chi square with the help of Statistical Package for Social Sciences (SPSS). The findings of the analysis of data revealed that there was a no significant relationship between the principals’ gender and ICT integration in management of public secondary schools in Kenya.

Efuwape and Aremu (2013) carried out a study on gender differences in acceptability and usability of computer based learning package in electrical and electronics technology in Nigeria. This study investigates gender differences in acceptability and usability of a computer learning package for teaching thermionic emission in electrical and electronics technology. This study adopts a causal comparative research design with the design and development of the learning package. 80 students in 200 Level and ND1 (First Year Students of National Diploma) of the department of Electrical and Electronics engineering and Technology in a University and Polytechnic in Ogun State formed the respondents for the study. 40 students are randomly selected from each school with the total number of 18 females and 62 males. The developed package and 43 questionnaire items were used as data collection tools. The designed and developed package was presented to each student for interaction and later the structured questionnaire (Cronbach alpha = 0.89) was administered to the respondents for data collection. Two research questions were raised and two hypotheses were tested in the study. Data collected were analysed using T-test at 0.05 level of significance. The research findings revealed a non-significant gender difference in both acceptability and usability of the FOSS-based

package ($df = 78$; $t = 1.620$; $p > 0.05$ and $df = 78$; $t = 0.668$; $p > 0.05$ respectively). Based on the findings, it is concluded that there most likely will not be gender differences in the achievement of males and females using this computer based package.

Zhou and Xu (2007) carried out a study on adoption of educational technology: how does gender matter? The study was carried out in Canada. One of its purposes was to inform our understanding of how gender matters in the process of technology adoption in post-secondary teaching. Gender differences have attracted attention in today's educational research and practice. Very few studies, however, explore the gender differences in the use of technology in higher education. The authors conducted a study on technology adoption at a large Canadian university. A survey was administered to all full-time faculty and sessional instructors. Results suggest that females were more likely to use student-centered pedagogical approaches in teaching than males. Females had lower confidence and less experience in the use of computers in teaching. They tended to learn how to use technology from others, whereas males were more likely to learn from their own experience.

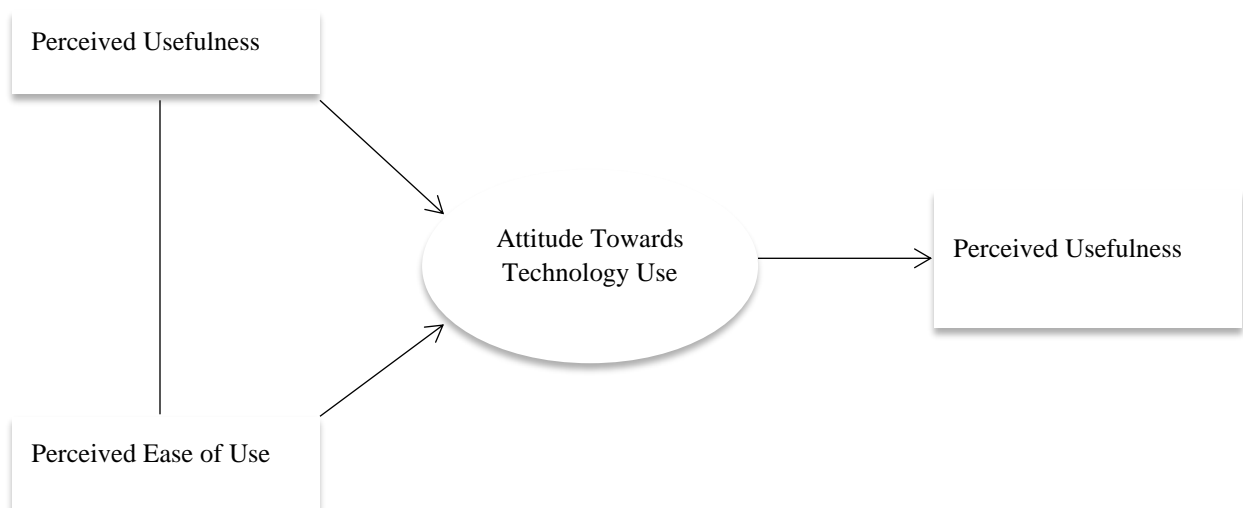
Bervell, Ahiatrogah, Laryea, and Essilfie (2013) carried out a study on integrating information technology into pedagogy: the gender perspective. The study was carried out in Ghana. This study investigated the seeming gender dichotomy in perception among social studies teachers towards the use of technology in instructional practice in the senior high schools of Cape Coast Metropolis. The theoretical framework of the study are essentialism and social construction. A descriptive research design was adopted and questionnaire used to collect data from a purposive sample of 50 social studies teachers who have completed some form of technology integration training. An independent t-test was computed in analyzing the data at an alpha level of 0.05. The findings revealed a higher mean response for females than males in terms of perception on training, competence and importance of technology integration. The difference was however statistically insignificant ($p > 0.05$). The result depicted a gradual closure of the gender technology gap.

2.4: Theoretical Framework

Technology acceptance model (TAM)

TAM has been found to be useful in explaining user behavior across a broad range of end-user computing technologies and user populations. The relationships between perceived usefulness, perceived ease of use, attitude towards the technology and intention to use technology are specified in the TAM. TAM assumes that an intention to use a particular technology is an important factor that determines whether users will actually utilise it (actual system use). The close association between intention to use and actual use has been supported by research (Yi & Hwang, 2003).

Figure 2.1: Framework



Source: Adapted from Tao, Fan and Du (2015).

The intention to use is influenced by attitude toward computer use, as well as the direct and indirect effects of perceived usefulness and perceived ease of use. Both perceived usefulness and perceived ease of use jointly affect attitude toward computer use and perceived ease of use has a direct impact on perceived usefulness. Perceived usefulness refers to the degree to which a person believes that using a certain system (e.g. computers) enhances his/her productivity. In contrast, perceived ease of use is about the extent to which a person thinks that using a system will be relatively free of effort.

3.0: METHODOLOGY

The research design adopted in the study is a cross-sectional research design alongside a survey research approach. Questionnaires were administered to selected respondents (teachers) in secondary schools in Ogun State. The population of study comprises secondary schools in Ogun State. 50 schools were selected across Ogun State using convenience sampling. The schools selected are mostly situated in urban regions where technology (ICT) is believed to be popular.

A structured questionnaire adapted from relevant past surveys was used as data gathering instrument. The questionnaire was divided into two sections. Section A captures demographic characteristics and Section B captures educational technology variables. The reliability of research instrument is outlined below

Table 3.1: Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item- Total Correlation	Cronbach's Alpha if Item Deleted
Computer Software/Games	4.61	1.181	.495	.640
Internet/Social Media	4.30	1.404	.379	.704

Table 3.2: Reliability Statistics

Cronbach's Alpha	No of items
.705	4

From the results above, it is evident that the overall reliability value (Cronbach's Alpha) is 0.705. This implies that Cronbach's Alpha value is very high (close to 1) and can be concluded that the research instrument (questionnaire) is very reliable.

Method of Data Analysis

The data gathered through the use of structured questionnaire were analyzed using cross tabulations and chi-square. The Statistical Package for Social Sciences (SPSS) version-21 was used to conduct the above analyses.

4.0: DATA PRESENTATION AND ANALYSIS

4.1: Frequency Statistics for Demographic Variables

Table 4.1: Frequency of Gender

		Gender			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	76	50.0	50.0	50.0
	Female	76	50.0	50.0	100.0
	Total	152	100.0	100.0	

Table 4.2: Frequency for years of experience

		Years of Experience			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0-5	42	27.6	27.6	27.6
	6-10	44	28.9	28.9	56.6
	11-15	32	21.1	21.1	77.6
	16+	34	22.4	22.4	100.0
	Total	152	100.0	100.0	

Table 4.3: Frequency for Qualification

		Qualification			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Below NCE	1	.7	.7	.7
	NCE	34	22.4	22.4	23.0
	Degree only	49	32.2	32.2	55.3
	Degree/PGDE	28	18.4	18.4	73.7
	NCE/Degree	40	26.3	26.3	100.0
	Total	152	100.0	100.0	

4.2: Crosstabs Output

Table 4.4: Computer Software/Games * Gender

			Gender		Total
			Male	Female	
Computer Software/Games	No	Count	37	45	82
		% within Computer Software/Games	45.1%	54.9%	100.0%
		% within Gender	48.7%	59.2%	53.9%
	Yes	Count	39	31	70
		% within Computer Software/Games	55.7%	44.3%	100.0%
		% within Gender	51.3%	40.8%	46.1%
Total	Count	76	76	152	
	Software/Games	50.0%	50.0%	100.0%	
	% within Gender	100.0%	100.0%	100.0%	

Table 4.4: Chi-Square Tests Computer Software/Games * Gender

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.695 ^a	1	.193
Continuity Correction ^b	1.298	1	.255
Likelihood Ratio	1.698	1	.193

Table 4.5: Social Media * Gender

			Gender		Total
			Male	Female	
Social Media	No	Count	21	15	36
		% within Social Media	58.3%	41.7%	100.0%
		% within Gender	27.6%	19.7%	23.7%
	Yes	Count	55	61	116
		% within Social Media	47.4%	52.6%	100.0%
		% within Gender	72.4%	80.3%	76.3%
Total	Count	76	76	152	
	% within Social Media	50.0%	50.0%	100.0%	
	% within Gender	100.0%	100.0%	100.0%	

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.310 ^a	1	.252
Continuity Correction ^b	.910	1	.340
Likelihood Ratio	1.315	1	.251

4.3: Hypothesis Testing

Hypothesis 1

The null hypothesis states there is no significant relationship between gender and the use of computer software/games in secondary schools in Ogun State. From the chi-square test for computer software/games above, the p-value is 0.193. At a 0.05 level of significance, we do not reject the null hypothesis and conclude that there is no significant relationship between gender and the use of computer software/games in public secondary schools in Ogun State.

Hypothesis 2

The null hypothesis states there is no significant relationship between gender and the use of internet/social media in secondary schools in Ogun State. From the chi-square test for internet/social media above, the p-value is 0.252. At a 0.05 level of significance, we do not reject the null hypothesis and conclude that there is no significant relationship between gender and the use of internet/social media in public secondary schools in Ogun State.

4.4: Interpretation of Results

From the chi-square test for computer software/games above, the p-value is 0.193. At a 0.05 level of significance, we do not reject the null hypothesis and conclude that there is no significant relationship between gender and the use of computer software/games in secondary schools in Ogun State. From the crosstab, it is evident that the use of computer software/games is near even distribution as 45.1% of those that use computer software/games are male while 54.9% of those that use computer software/games are female. However, the perceived usefulness of computer games/software is a bit higher among female teachers. Furthermore, from the chi-square test for internet/social media above, the p-value is 0.252. At a 0.05 level of significance, we do not reject the null hypothesis and conclude that there is no significant relationship between gender and the use of internet/social media in secondary schools in Ogun State. From the crosstab, it is evident that the use of internet/social media is near even distribution as 58.3% of those that use internet/social media are male while 41.7% of those that internet/social media are female. However, the perceived usefulness of internet/social media is a bit higher among male teachers.

It is clear from the findings that the use of both computer games/software and internet/social media by secondary school teachers in Ogun State is evenly distributed between male and female teachers. This findings refuted the studies carried out by Kay, 2006; Volman and Van Eck, 2001; Wozney, Venkatesh, and Abrami, 2006; Zhou and Xu 2007 which alluded to the fact that female teachers tend to have less use of computers and/or technology in their pedagogy than their male counterparts, because of their more limited access to technology, their interest level, and their skill. This shows that female teachers have improved over the years in integrating educational technology. Nonetheless, only 46.1% of respondents use computer games/software. The implication of this is that, educational technology has not been well integrated by teachers in secondary schools in Ogun State in the area of computer games/software. However, the use of internet/social media is quite popular among secondary school teachers in Ogun state as 76.3% of respondents make use of it.

5.0: SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

The findings of the study are summarized as follows:

There is no significant relationship between gender and the use of computer software/games in public secondary schools in Ogun State. Also, there is no significant relationship between gender and the use of internet/social media in public secondary schools in Ogun State.

The use of both computer games/software and internet/social media by secondary school teachers in Ogun State is evenly distributed between male and female teachers. It is also observed that the perceived usefulness of computer games/software is a bit higher among female teachers, whereas the perceived usefulness of internet/social media is a bit higher among male teachers.

Educational technology has not been well integrated by teachers in secondary schools in Ogun State in the area of computer games/software. Only 46.1% of respondents use computer games/software. However, the use of internet/social media is quite popular among secondary school teachers in Ogun State as 76.3% of respondents make use of it.

The findings of the study refuted the studies carried out by Kay, 2006; Volman and Van Eck, 2001; Wozney, Venkatesh, and Abrami, 2006; Zhou and Xu 2007 which alluded to the fact that female teachers tend to have less use of computers and/or technology in their pedagogy than their male counterparts, because of their more limited access to technology, their interest level, and their skill. This shows that female teachers have improved over the years in integrating educational technology at secondary school level.

It is evident that female teachers have improved over the years in integrating educational technology at secondary school level. The study recommended that female teachers should be further encouraged in integrating educational technology in their pedagogy, most especially in the area of the use of internet. Furthermore, only 46.1% of respondents use computer games/software. The implication of this is that, educational technology has not been well integrated by teachers in secondary schools in Ogun State in the area of computer games/software. The study recommended that secondary school owners and teachers should improve in this area.

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