Profiles of Stages and Attitudes Regarding Technology Adoption in Teaching Among PHE Teachers in Nigerian Primary and Secondary School

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Abstract

The study investigated level of adoption and attitude towards technology use in teaching among primary and secondary schools Physical and Health Education teachers. Two standardized instruments, "Assessment of Impact of Technology in Education Questionnaire" (AITEQ) and "The Secondary Physical Educators' Attitudes and Technology Practices Inventory" (SPEATPI) elicited information from 122 (PHE teachers on technology use. Mean age 32.64 years. The participants consisted of 67 primary school PE teachers (54.9%) and 55 secondary school PE teachers 45.1%). With respect to gender, 41(33.6%) were males, and 81(66.4%) were females. A descriptive survey was adopted in the study and the data were analysed using descriptive statistics of frequencies, percentages, mean, while the chi-square and t-test were the inferential statistics used for testing the hypotheses. With regards to the stages of adoption by PHE teachers, result indicated that only 20(16%) of the entire population can apply technology in the classroom or workplace, while 30 (24.6%) are at the awareness stage that 'technology exist but have not used it'. Others are either trying to learn the basics 11(9.0%) or beginning to understand the process of using technology 31(25.4%). There was observed gender difference with regard to stages of technology adoption but not in teaching categories. The general teachers' attitude towards adoption and utilization of technology was positive (M=2.70, SD=0.35. However, of the three specific dimensions of PE teachers' attitude studied, result further indicated positive attitude of teachers towards importance/relevance of technology to PE teaching (M=2.82, SD 0.41) and contextual factors (M=2.38, SD =0.57) and negative attitude toward technology and their teaching style (0.72, SD=0.26). There were no significant differences in attitude between primary and secondary school teachers, however there was a significant difference on attitude based on gender. It was concluded that although PHE teachers demonstrated positive attitude towards technology adoption, they are still far behind in the use of technology in teaching physical and health education classes. Recommendations were made based on the findings.

Keywords: Technology, Attitude, Adoption, Utilization, Physical Education, Health Education

Introduction

Sustainable national development in all sectors are unequivocally dependent on technology adoption and implementation. In education, embracing and application of technology in instructional delivery by curriculum implementers has been globally acknowledged as a formidable tool for facilitating learning of diverse skills and competences in schools. In addition, technology adoption guarantees quality instructional delivery among teachers and help in developing students' trust and positive attitude to learning (Yamman, 2008).

The teacher is key to effective implementation of the use of computer technology in the educational system because the success of any enterprise to employ computer technology in an educational programme depends on the support and attitudes of teachers involved (Sabzbzian and Gilakjani, 2013). Given that teachers have tremendous potential to transmit beliefs and values to students, it is important to understand the biases and stereotypes that they may hold about the adoption and use of technology and the factors that act as facilitators to teachers' positive computer usage.

Teachers' attitude towards computers and its adoption affect the successful use of computers in classroom activities and these attitudes, whether positive or negative, affect how teachers respond

to technologies. Teachers' attitudes play outstanding role in educational interaction as well as classroom (Albion &Ertmer, 2002; Becker, Ravitz, & Wong, 1999). According to Becker et al., (1999) and Gobbo and Girardi (2001) a positive relationship exists between computer technology usage and teachers' attitudes. Loyd and Gressard (1986) showed that positive attitudes toward computers are positively correlated with teachers' extent of experience with computer technology. Understanding and improving their instruction in the classroom inform students' consequent mastery of content and in achievement of reliable learning outcome.

Attitude has been variously conceptualized, Fishbein and Ajzen (1975) emphasized that an attitude is a learned predisposition to respond in a consistently favourable or unfavourable, positive or negative manner with respect to a given object, situation, institution or person. According to Eagly and Chaiken (1993), attitude is a psychological tendency that is expressed by evaluating a particular entity with some degree of favour or disfavor. Attitude in the context of this study is the predisposition of primary and secondary school teachers towards the adoption and utilization of computer technology.

Computer attitude has been defined as a person's general evaluation or feeling of favour or antipathy toward computer technologies and specific computer related activities (Smith, Caputi and Rawstorne, 2000). Computer attitude evaluation usually encompasses statements that examine user's interaction with computer hardware, computer software other persons relating to computers, and activities that involved computer use. Computer-related activities examined are either single instances of behavior (e.g. specific software use) or classes of behavior (e.g. attaining computer related courses) (Smith, Caputi and Rawstorne, 2000).

Positive attitude toward technology adoption and utilization increase the use of technologies in teaching and learning, on the other hand, negative attitudes limit learning associated with technology use. According to Woodrow (1992), positive teaching attitudes toward computers are generally documented as an indispensable condition for effective use of information technology in the classroom. In line with the view of the author, positive attitudes should be encouraged and developed, while understanding and addressing negative attitudes may contribute to increased teachers' willingness to utilize technology in the teaching of Physical education skills in the content areas that will be appealing to all students regardless of status.

Attitudes toward technology adoption and utilization are influenced by different variables such as training (Tsitouridou & Vryzas, 2003), knowledge about computers (Mukti, 2000), computer anxiety and liking (Yildirim, 2000), and computer experience. In most cases, many of these factors interact with one another to influence on attitudes towards computers. On the other hand, attitude towards technology adoption and utilization in the classroom can be determined by the perception regarding the importance of technology by the teacher, other contextual factors, and teaching styles related to technology.

In most developing countries, Moonen, (2008), and Tilya, (2008) observed that technology policies are still at the developing and the impact of their practices in educational system are found to be insignificant.

According to Unwin, (2005) technology policies appear to emphasize the provision of technology infrastructure to secondary and primary schools rather than their use in pedagogy. And studies of Nihuka & Voogt, (2011) and Bingimlas, (2009) have shown that secondary school teachers lack computers and internet for teaching and learning process. In Nigeria, the use of modern information communication technology tools and systems such as computers and internet for teaching in primary and secondary schools is still in its infancy stage and it is doubtful whether meaningful attention has been given in determining the profile of adoption and use of technology in the teaching of Physical and Health Education in Nigerian primary and secondary schools.

Research on PE teachers' attitude to adoption and utilization of technology in physical Education class appears to be lacking in Nigeria and no study has investigated simultaneously the PE teachers' level of adoption and their attitude towards adoption and utilization of technology in physical Education. Understanding the profile of stages of adoption and attitude towards technology usage among PE teachers in Nigeria may provide the needed data and impetus for NAPHER. SD to realign objectively towards sustainable teachers' adoption and utilization of technology in their professional practice.

Two specific objectives and two null hypotheses guided the study. They were to determine the stages and attitude towards adoption of technology based on categories of teachers and gender.

Method

The descriptive survey research was adopted in this study to determine the stage of adoption and utilization and attitude among the population of physical education teachers in both secondary and primary schools in Enugu State Nigeria. A sample of 122 Sandwich student Physical Education Teachers participated in the study. The age range was between 25 and 55, with a mean age of 32.64 years. The sample consisted of 67 primary school PE teachers (54.9%) and 55 secondary school PE teachers (45.1%). With respect to gender, 41(33.6%) were males, and 81(66.4%) were females.

Two research instruments were used for data collection. They include the instrument for assessing the impact of technology in Education (Christensen, 1997) which collected information on the stages of adoption of technology among PE teachers and modified "The Secondary Physical Educators' Attitudes and Technology Practices Inventory (SPEATPI) adapted from Gibbone, Rukavina, and Silverman, (2010) designed to elicit information on the attitude of PE teachers towards technology. Data were analyzed using both descriptive statistics of frequencies, percentages, means and inferential statistics of chi-square and t-test.

Results

Research Question One: What are the stages of adoption and utilization of computer technology among Physical and Health Education teachers generally on one hand, and based on gender and categories of teachers on the other?

Table 1
Stages of Adoption Regarding Technology among PHE Teachers and According to gender

	Male		Female		**Total**	
	F	**%**	F	**%**	F	**%**
Stage 1 Awareness I am aware that technology exists but have not used it - perhaps I'm even avoiding it.	18	**43.9**	12	**14.8**	30	**24.6**
	0	**0**	11	**13.6**	11	**9.0**
Stage 2:Learning the Process I am currently trying to learn the basics.	13	**31.7**	18	**22.2**	31	**25.4**
Stage 3: Understanding & Application I am beginning to understand the process of using technology						
Stage 4: Familiarity & Confidence I am gaining a sense of confidence in using the computer for specific tasks.	7	**17.1**	17	**21.0**	24	**19.7**
	3	**7.3**	3	**3.7**	6	**4.9**
Stage 5: Adaptation to other context I think about the computer as a tool to help me	0	**0**	20	**24.7**	20	**16.4**
Stage 6: Creative Application of new Context I can apply what I know about technology in the classroom or workplace						
Total	41	**33.6**	81	**66.4**	122	**100.0**

Table 2
Stages of Adoption Regarding Technology Usage based on categories of teachers

	Primary School Teaching		**Secondary School Teaching**		**Total**	
	F	*%*	F	*%*	F	*%*
Stage 1 Awareness I am aware that technology exists but have not used it - perhaps I'm even avoiding it.	15	***22.4***	15	***27.3***	30	***24.6***
Stage 2: Learning the Process I am currently trying to learn the basics.	5	***7.5***	6	***10.9***	11	***9.0***
Stage 3: Understanding & Application I am beginning to understand the process of using technology	16	***23.9***	15	***27.3***	31	***25.4***
Stage 4: Familiarity & Confidence I am gaining a sense of confidence in using the computer for specific tasks.	15	***22.4***	9	***16.4***	24	***19.7***
Stage 5: Adaptation to other context I think about the computer as a tool to help me	6	***9.0***	0	***0***	6	***4.9***
Stage 6: Creative Application of new Context I can apply what I know about technology in the classroom or workplace	10	***14.9***	10	***18.2***	20	***16.4***
Total	67	***54.9***	55	***45.1***	122	***100.0***

Table 3
Chi-square regarding stages of Adoption of technology based on gender and category of teachers

Chi-Square Tests

	GENDER			CATEGORY OF TEACHER		
	Value	df	Asymptotic Significance (2-sided)	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	26.956[a]	5	.000	6.506[a]	5	.260
Likelihood Ratio	35.929	5	.000	8.775	5	.118
Linear-by-Linear Association	12.386	1	.000	.774	1	.379
N of Valid Cases	122					

Table 1 shows the general stages of technology adoption by Physical and Health and Health Education Teachers. A highest percentage of teachers were at the third stage of beginning to understand and apply the process of using technology (25.4%), followed by those at the lowest or first stage of adoption (24.6%) which is "awareness that technology exist but have not used it". 19.7% of teachers are in stage four indicating that they were just getting familiar with technology, only 16 % of the PHE teachers indicated that they can apply technology in the class room. With regards to gender, 43.9% of male and 14.8% of female teachers were in the awareness stage, 31.7% and 22.2% of male and female respectively were at the stage three. However, only 24.7% of females PHE teachers indicated that they apply technology in their teaching with their male counterpart indicating none.

With regard to stages of adoption regarding technology usage based on categories of teachers, results in Table 2 show closely the same pattern of presentation for both primary and secondary school respectively. Greater percentage of both categories were at the third stage 23.9% (Primary) and 27.3% (Secondary) followed by those at the lowest stage Primary 22.4% and secondary 27.3%. For the Application of technology stage, 14.9% of primary school PHE teachers and 18.2% of Secondary school PHE teachers acknowledge that they can apply technology in the class room.

Chi-square test to explore influence of gender and category of teachers independently indicate in table 3 that there was a significant association between gender and stages of technology adoption in teaching PHE in schools [$\chi 2$ (5, n = 122) = 26.96, p = .05], . However, no significant association was found between category of staff and stages of adoption of technology in teaching physical and health Education [$\chi 2$ (5, n = 122) = 6.51, p = .26].

Research Question Two: What is the general attitude and the attitudes based on gender and categories of teachers of Physical and Health Education teachers with respect to technology adoption and utilization in the teaching of the subject?

Tables 4-8 explain the attitude of teachers regarding the adoption of technology in their practice. Table 4 indicates that teachers irrespective of gender and category have positive attitude towards the adoption of technology (M=2.70, SD=0.35). However, with respect to the specific three areas which they were expected to express their attitude, the finding reveals that teachers only had positive attitude with regards to their perception of importance or relevance of technology to PHE (M=2.82, SD=0.41) and contextual factors (M=2.38, SD=0.57) but less favourable attitude towards adoption of technology in their teaching style.

Table 4.
General Attitude of Teachers regarding Technology Adoption and Utilization in the teaching of Physical Education in Schools (N122)

		Mean	Std. Deviation
PERCEPTION OF IMPORTANCE/ RELEVANCE	Technology can enhance the quality of Health and Physical Education.	3.53	.632
	Having more technology available would increase my use when teaching.	3.27	.813
	After learning something about technology, I attempt to implement it.	3.33	.686
	Technology training has been a positive experience for me.	3.25	.903
	I would consider technology when redesigning my curriculum.	3.08	.788
	I make an effort to apply a variety of technology within my instruction.	2.96	.876
	CLUSTER VALUE	**2.82**	**0.41**
CONTEXTUAL FACTORS	I am expected to be knowledgeable in uses of technology.	3.46	.718
	In my school, most teachers use technology when teaching.	2.25	1.007
	I know of many HPE teachers who use technology to teach.	2.09	.962
	I have enough technology equipment appropriate for my class size.	1.80	.833
	I can easily access technology resource personnel in my school.	2.30	1.034
	CLUSTER VALUE	**2.38**	**0.57**
TEACHING STYLE	Technology takes time away from more important concerns.	2.37	.929
	Technology does not accommodate personal learning styles.	2.09	.962
	It is difficult using technology to teach HPE.	1.99	1.056
	CLUSTER VALUE	**0.72**	**0.26**
	TOTAL ATTITUDE TOWARD ADOPTION AND UTILIZATION OF TECHNOLOGY IN TEACHING PE	**2.70**	**0.35**

Table 5:
Attitude of Teachers regarding Technology Adoption and Utilization in the teaching of Physical Education in Schools based on gender

	GENDER					
Attitude towards Adoption and Utilization of TECHNOLOGY with regards to:	MALE			FEMALE		
	N	Mean	Std. Deviation	N	Mean	Std. Deviation
IMPORTANCE/ RELEVANCE	41	2.96	.31	81	2.76	.44
CONTEXTUAL FACTOR	41	2.44	.57	81	2.34	.57
TEACHING STYLE	41	.69	.30	81	.73	.24

Table 6:
Attitude of Teachers regarding Technology Adoption and Utilization in the teaching of Physical Education in Schools

Attitude towards Adoption and Utilization of TECHNOLOGY with regards to:	CATEGORY OF SCHOOL					
	Primary School Teaching			Secondary school Teaching		
	N	Mean	Std. Deviation	N	Mean	Std. Deviation
IMPORTANCE/ RELEVANCE	67	2.83	.38	55	2.81	.44
CONTEXTUAL FACTOR	67	2.39	.60	55	2.36	.53
TEACHING STYLE	67	.75	.27	55	.68	.24

Table 7:
t-test on Attitude of Teachers regarding Technology Adoption and Utilization in the teaching of Physical Education in Schools based on gender

Independent Samples Test

		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
TOTAL ATTITUDE TOWARD ADOPTION AND UTILIZATION OF TECHNOLOGY IN TEACHING PE	Male	2.435	.121	1.915	120	.058	.12879	.06726
	Female			1.719	61.271	.091	.12879	.07491
Total Perception and Relevance	Male	4.300	.040	2.722	120	.007	.20895	.07678
	Female			3.026	106.026	.003	.20895	.06905
TOTAL CONTEXTUAL FACTOR	Male	.248	.619	.920	120	.359	.10069	.10941
	Female			.921	80.571	.360	.10069	.10934
TOTAL TEACHING STYLE	Male	2.295	.132	-.694	120	.489	-.03463	.04993
	Female			-.647	67.220	.520	-.03463	.05350

Table 8:
T-test on attitude of Teachers regarding Technology Adoption and Utilization in the teaching of Physical Education in Schools based on category of teachers

Independent Samples Test

		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
TOTAL ATTITUDE TOWARD ADOPTION AND UTILIZATION OF TECHNOLOGY IN TEACHING PE	Primary School Teaching	.294	.588	1.415	120	.160	.09099	.06428
	Secondary school Teaching			1.415	115.174	.160	.09099	.06432
Total Perception and Relevance	Primary School Teaching	.887	.348	.260	120	.795	.01952	.07508
	Secondary school Teaching			.256	107.440	.798	.01952	.07617
TOTAL CONTEXTUAL FACTOR	Primary School Teaching	.305	.582	.298	120	.766	.03104	.10419
	Secondary school Teaching			.302	119.347	.763	.03104	.10291
TOTAL TEACHING STYLE	Primary School Teaching	4.508	.036	1.469	120	.144	.06914	.04707
	Secondary school Teaching			1.488	119.446	.139	.06914	.04647

Tables 5 and 6 reveal clearly that teachers expressed the same pattern of positive attitude across gender and category of teacher for 'importance and relevance of technology' and 'contextual factors' but still indicated less favourable attitude with respect to teaching style. Male however had consistently higher positive attitude than their female counterpart, while primary school teachers indicated slightly higher positive attitude than their secondary school counterpart.

Generally, attitude of male teachers did not differ significantly (Table 7) from male teachers, there was no significant difference in scores for males (M = 2.78, SD = .43) and females (M = 2.65, SD =.30; t (120) = 1.92, p = .09, two-tailed). However, there was a significant difference when their attitude scores on perception of relevance of technology were compared, males (M = 2.96, SD = .31) and females (M = 2.76, SD =.44; t (120) = 2.72, p = .007, two-tailed) indicating that the gender had differing level of attitude to technology with regard to their perception of technology relevance. Conversely, t-test did not reveal any significant difference in attitude possessed regarding technology adoption between primary and secondary school teachers, even across the three dimensions of interest (Table 8).

Discussion

The findings of the study revealed that very few school teachers can apply technology in the classroom or workplace, and are also aware that technology exist but have not used it, while others are either trying to learn the basics or beginning to understand the process of using technology. These findings contradict the purported general opinion about the importance of technology adoption in Nigerian school system, whereas the use of technology was being accompanied by claims and promises of enhanced learning for students (Onu, 2005). These findings are apt considering the fact that most school teachers do not have prerequisite knowledge on the use of computer and also most schools do that have the necessary technology facilities and equipment. Etiubun and Akpan (2017), noted that every teacher is expected to possess the basic or personal technology skills in order to cope with the demand of twenty first century teaching and learning. The finding further reveals that majority of both male and female teachers do not use technology in both primary and secondary schools. This finding is very discouraging in the sense that teachers are seen as important factors in the education process as they are the last implementers of the curriculum. It is therefore recommended that governments and other relevant agencies should formulate policies that will create the needed opportunities for teachers of physical Education to be exposed and trained in the use of technology in classroom delivery.

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