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Cultural And School Factors As Predictors Of Mathematics Teachers' Use Of Information And Communication Technology For Instruction

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ABSTRACT
This study aims to find out if culture and school factors serve as predictors of mathematics teachers' use of information and communication technology for instruction in secondary school. The sample for this study comprises 171 secondary schools' teachers from 17 government-owned secondary schools in Ogun State, Nigeria. Data were collected through a questionnaire. The result shows that culture does not serve as a predictor of mathematics teachers' use of ICT for teaching but school factors serve as a predictor of mathematics teachers' use of ICT for teaching. It was also discovered that there was no significant relationship between culture and school factors as predictors of mathematics teachers' use of ICT for teaching. Based on these findings, it was concluded that the obtainability of ICT facilities and other factors in school is important to mathematics teaching..

Keyword*: Cultural Factors; School factors; Information and communication technology and predictor.*

INTRODUCTION

All nations need mathematics which is one of the school subjects for industrial and technological advancement and economic growth (National Curriculum Framework, NCF-2005). The study of mathematics requires the in-depth understanding of quantity, structures, space and change which is developed through the use of abstraction and logical reasoning, from counting, calculation, measurement and the study of the shapes and motion of physical objects (Nwoke & Nnaji, 2011). Mathematics is the queen of sciences, a servant of sciences and king of Arts subjects.

Mathematics remains the corner stone for any nation to develop technologically. This begins by developing her mathematical arts right from the classroom during instruction. One of the emphasis in Nigeria is on national development

through technology (Odili, 2006). This shows the need for mathematical concepts is needed for the development in the country. This is why Mathematics is made a core subject in Nigerian curriculum at all educational levels (Kay & Knaack 2008, Emma, 2015). The objectives of teaching mathematics at both junior and senior secondary include developing originality and curiosity in the learners; acquiring relevant manipulative skills; emphasizing the wide applicability of mathematics in various fields; and leading the learners to discover and appreciate the beauty and elegance of Mathematics. These objectives are also in line with the objectives of the National Policy on Education (FRN, 2013). The set goals could be achieved through the use of innovative ways of teaching mathematics in Nigeria such as the use of Information and Communication Technology (ICT).

However, the use of Information and Communication Technology (ICT) in teaching and learning in a developing country like Nigeria still faces challenges. Cox, Preston and Cox (1999), also opined that there are a number of factors which have been identified to influence teachers' use of ICT in the classroom. Such factors are the culture of the people in the country and the usage level in the schools (school factor). A lot of differences exist between education and the culture of the country which also affect the use of technology for instructional delivery. Culture is the collective programming of the mind that distinguishes the members of one group from another which can also be their arts, customs, lifestyles, background and habits that characterize the group. Culture is really affecting the national development because of its influence on the use of ICT for instructional delivery. In order to investigate these factors further in relation to teachers' ICT usage in schools in Nigeria.

Teacher use of ICT have identified staff development as one of the contributing factors in using information and communication technology effectively in the classroom. McCartney (2004) gave a report on an investigation into effective staff development in information and communication technology for teachers. A sample of Scottish primary school teachers have been surveyed to investigate the impact of different models of staff development in information and communication technology on the teacher and to explore the knowledge and skills gained by teachers from staff development: technical; academic/content-related; pedagogy. The ability and the willingness of the teachers to get trained in the knowledge of the use of information and communication technology both for personal use and work depend solely on the cultural framework of the teacher.

Apart from the cultural values found to be a notable influence on the teachers use of information and communication technology for teaching mathematic in secondary school, a developing country like Nigeria still faces the challenge of various factors surround the school which is also perceived as an influence on the use of information and communication technology for teaching mathematics in secondary schools. Facilities are not sufficiently provided for teaching – learning process in the secondary schools. This might account for why teachers are not making use of them in their teaching.

The use of ICT facilities for instructional purposes includes facilitating teaching method, strategies and techniques for systematized feedback (Ajayi, 2008). It must however be stressed that the effective use of the various method of the ICT in teaching leaning depends on the availability of these facilities. Teachers as well as students appear not to be knowledgeable in the use of ICT because there appears not to be any official training for both the teachers and the students in the schools. Nwite, (2007), Yusuf, Ajidagba, Yusuf, Amali, Bello, Oniye, (2012) opined that the multifaceted problems militating against the effective use of Information and Communication Technology in the teaching learning process in schools. These include: irregular power supply, inadequate computer literate teachers, unavailability of space for ICT gadgets, unconducive environment due to over population of students, ignorance of the importance of the effective use of ICT for teaching and learning process by the teacher, student and the school managerial bodies and so on. These problems still thrives because the total way of life of the people in the society goes against the use of modern technology.

METHOD

The study was limited to the cultural and school factors as predictors of mathematics teachers' use of ICT for teaching in the secondary schools. The target population of this study include all the teachers in the government owned secondary schools in Ogun State, Nigeria. The study is a descriptive research of the correlational

type. Secondary school mathematics teachers in Ogun State, Nigeria were purposively selected for the study. A researcher-designed questionnaire entitled "Cultural and School Factors as predictors of mathematics teachers' use of ICT for teaching" was used to collect data for the study. The instruments comprise sections A, B and C. Section A requires the respondents' bio-data information. Section B contained items on school factors being considered in the study. It has four sub-sections BI, BII, BIII and BIV Section B I School environment with 5 items, Section BII school facilities with 5 items, Section B III covered teacher's competency with 6 while section BIV covers the teachers discipline with 7 items. Section C covers the cultural factors with 9 items. The total number of items is 32. A four-point rating scale response format was used for the items. This ranged from Strongly Agree (SA), Agree (A), Disagree (D), Strongly Disagree (SD). The validation of the instrument was done by the researcher's supervisor and other notable lecturer in the faculty of Education, faculty of Science and faculty of Art of University of Lagos. No ambiguity was determined was detected in the instrument. The reliability of the instrument was determined using 10 teachers that are not involved in the study. Reliability coefficient of 0.72 was determined using Cronbach Alpha. The questionnaire was administered on the selected respondents in their respective secondary school by the researcher. The copies of the questionnaires completed were collected immediately. A total of 181 copies of questionnaire were administered and 171 were collected giving a 94.5% return rate. Mean and Standard deviation were used to answer research question 1and 2 while Pearson Product Moment Correlation (PPMC) were used to test the hypothesis.

RESULT AND DISCUSSION

The data collected from this research were coded, analyzed and interpreted. The result of the analysis interpreted using mean Pearson Product Moment Correlation (PPMC) for the relationship.

Table 1: Analysis of the mean of cultural factors

S/N	Cultural Factors	
1	Farming as our major occupation affects the use of ICT	2.06
2	Our religion which is traditional is against the use of ICT	3.18
3	The way we eat our traditional food does not support the use of technology for teaching	3.08
4	The use of ICT is against our cultural believes	3.13
5	Predestined names in our culture does not allow the use of ICT	3.20
6	Our traditional methods of teaching such as storytelling, songs, poetry, oral teaching, etc. is better than ICT use for teaching	2.16
7	Our culture support and allows the use of ICT for learning	2.90
8	Our artistic cultural design instructs better than ICT	2.11
9	The gods of our land does not allow the native and resident of the land to use of ICT related tools	3.13
	Average Mean	2.42

Table 1 reveals that farming as our major occupation affects the use of ICT has mean score of 2.06, religion which is traditional is against the use of ICT has a mean score of 3.18, the way we eat our traditional food does not support the use of technology for teaching has a mean score of 3.08, the use of ICT is against our cultural believes has a mean score of 3.13, Predestined names in our culture does not allow the use of ICT has a mean score of 3.20, our traditional methods of teaching such as storytelling, songs, poetry, oral teaching, etc. is better than ICT use for teaching has a mean score of 2.16, our culture support and allows the use of ICT for learning has a mean score of 2.90, our artistic cultural design instructs better than ICT has a mean score of 2.11 and the gods of our land does not allow the native and resident of the land to use of ICT related tools has a mean score of 3.13. The average mean score is 2.42 which is lesser than 2.50 bench mark. This implies that cultural factors do not serve as a predictor of teachers' use of ICT

Table 2: Analysis of the mean of school factors

	School Environment	Mean
1	My school is located in a very conducive environment	3.02
2	The classrooms in my school are very spacious	2.81
3	The class sizes in my school are moderate	2.82
4	The sitting arrangement of the classrooms in my school is very organized	2.40
5	There is adequate ventilation in the classrooms in my school	3.10
	Average Mean	2.83
	School Facilities	Mean
1	There is a well-equipped computer laboratory in my school	2.72
2	There is regular power supply in my school	2.04
3	All the information and communication technological tools available in my school are adequate and in good condition	1.97
4	I have access to any instructional material I needed as and when due	2.14
5	My school always maintain and upgrade the available information and communication technological tools	2.26
	Average Mean	2.23
	Teacher's Competency	Mean
1	I can operate the computer effectively	2.83
2	I can use major soft wares like (MS Word, Excel, Power point)	2.61
3	I know how to use information and communication technology as instructional aids for my teaching	2.73
4	I have access to my school Wi Fi to surf for instructional materials online whenever the need arises	2.10
5	I can effectively use the internet to surf for my instructional materials when the need arises to aid my teaching	2.52
6	I surf the internet	2.57
	Average Mean	2.56
	Discipline	Mean
1	I am a punctual and regular teacher in my school	3.64
2	I am available and accessible to the students	3.56
3	I ensure I am not distracted to search for other things whenever I surf for instructional materials online	3.01
4	I ensure the students use the computer for the right purpose whenever I teach them with it	2.44
5	I ensure I master all the instructional and technical procedures properly before going to teach my student with any information and communication technological tools	2.87
6	I monitor the student progress and give them feedback	3.18
7	I have good control of my class at all times	3.47
	Average Mean	3.17
	Over Mean	**2.74**

Table 2 reveals that school environment has a mean score of 2.83, school facilities has a mean score of 2.33, teacher's competency has mean of 2.56 and discipline has mean of 3.17. This implies that teacher's discipline serves as a predictor of teachers' use of ICT for teaching mathematics since it has the highest mean of 3.17, school environment also serves as a predictor of teacher's use of ICT for teaching mathematics with the mean score of 2.83 and teacher's competency is also a predictor of teacher's use of ICT for teaching mathematics with the mean score of 2.56 which is greater than the bench mark of 2.50. School facilities does not serve as a predictor of teacher's use of ICT for teaching mathematics since its mean is less than the bench mark of 2.50.

Based on the descriptive analysis on cultural factors and school factors as predictors of mathematics teachers use of ICT for instruction.

It was revealed that cultural factors do not predicts teachers' use of ICT. It was confirmed that culture does not determine whether mathematics teachers use information and communication technology for teaching or not irrespective of their location and background. This result is in agreement with White (2007), Kay & Knaack (2008) and Odili, (2006) reported how many of the patterns and practices of everyday life are shifting and changing at different rates in response to the powerful global processes that often appear beyond immediate local control, belief or even comprehension. This result is also in agreement with Wokocha (2011), Davis (2017) opined that the globalised world was made possible by the discovery of the computer and internet which has made the world virtual by transmitting information across the globe in a matter of micro-seconds. This finding implies that the world is about to leave behind anyone that is not ICT complaint.

Table 3: Relationship between Cultural and School Factors

Variable	N	r	p
Cultural Factors	171		
		0.701	0.072
School factors	171		

A Pearson product-moment correlation was run to determine the relationship between cultural and school factors as predictors of mathematics teachers' use of ICT for teaching. There was no strong, positive correlation between cultural and school factors as predictors of mathematics teachers' use of ICT for teaching, (r = .701, n = 171, p = .072).

There was no significant relationship between cultural and school factors as predictor of Mathematics teachers' use of ICT for teaching. This implies that everyone is supposed to be technologically inclined no matter their personality and where they are from. The global world is changing consistently and individual who wants to remain relevant in the changing world is compelled to adapt to this changes in personal and profession area of life which does not leave the teaching and learning behind. This result is in agreement with Cabillan (2011) and Iperen (2006) opined that globalization in the 21st century is reaching almost all countries. Few places can elude contemporary trends and innovative practices are seen to spread even faster due to modern technology. This result is also in agreement with Cabillan (2011) and Gebremichael, (2014) asserted a necessity of addressing the need to shift the culture of mathematics learning to suit the features of globalization. In this case more specific contents should cover cognitive processes in hypermedia and multimedia learning, social issues in computer-supported collaborative learning, motivation and emotion in blended learning and e-learning.

CONCLUSIONS AND SUGGESTIONS

The study concluded that the use of Information and Communication Technology cannot be predicted by cultural and school factors as they do not correlate in the use of ICT for teaching mathematics. More so, cultural does not predict the use of ICT for instructional delivery but school factors does. This implies that any teacher who desire to remain relevant to self and the Nigerian educational system must embrace technological development regardless of his or her cultural believes and background. There is also a need for provision of adequate technological tools in secondary schools, the enhances the totality of the schools factors to suit the global development in order to ensure that our mathematics teaching and learning is in good quality and in tune with the world's mathematics level.

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