Science and Technology Teacher'S Level of Awareness of Nigeria'S ICT Initiatives for Teaching

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Abstract

The study looked at the list of Nigeria's ICT initiatives and attempted to find out whether science and technology teachers (STTs) are aware of the existence of these initiatives that are available in Nigeria for teaching and research. It further looked into the constraints and hindrances to STTs' awareness of the ICT initiatives. One research instrument was used in the study. A questionnaire was administered on STTs. STTs' questionnaire was structured along the line of teaching and research. It featured questions on respondent's personal data, establishment information and respondents' awareness of Nigeria's ICT initiatives. Some of the major findings were that none of Nigeria's ICT initiatives within the last twelve years (2000 – 2011) was specifically or exclusively designed or implemented for STTs. The results of the mean response analysis, analysis of variance (ANOVA) and frequency of responses indicated that there was significant difference in STTs' opinions pertaining to eight of Nigeria's ICT initiatives regarding their awareness of the initiatives. The implications of these findings for science and technology programmes and STTs were indicated. It is therefore suggested that Nigeria's ICT initiatives awareness campaign should be mounted for STTs and the challenges identified in the study should be address urgently.
Keywords: ICT Initiatives, Science and Technology Teachers, Awareness.

Background and Literature Review

Technology can be defined as the application of practical sciences to industry, education or commerce in form of methods, systems, theories and practice. Forbes and David (2002) in the book titled, From Followers to Leaders: Managing technology and innovation, defines Technology as the form of human activity which is devoted to the production of technics [material products of human making or fabrication] and whose root function is to expand the realm of practical human possibility.

Technology for science and technical education today is comparable to what industrial machines were to the industrial revolution. In today's world they are engines of education, growth, power and wealth; very crucial to teaching, learning & research; for economic and social development. Adam (2003), UNCTAD (2008) and Wakefield (2010) all agreed that advancements and changes in technology have been frequent and has brought major contributions to the growth of the information society, as a result of which e–learning, e–books, e-library, e-banking, e–health, e–government, e-education, etc; were developed and are now available.

World Bank and Melinda Gates Foundation (2002) observed that technology, even in small amounts helps communities overcome convention and tradition, and to take leaps forward. According to Osunade (2003), Ugbodaga (2003), Owhotu (2006), Osunkunle (2008) and Adeoye (2011) technology offers a unique opportunity to extend learning support beyond the classroom. Technology raises the quality of classroom discussion and involves students much more deeply in their own education. Innovative changes has taking hold on most of the audio materials, visual materials, instructional techniques, etc, that are used in teaching, learning and research; they are delivered now in varieties of information and communication technologies (ICTs). In modern times most of the technologies available for teaching and learning are highly dependent on computers, the internet and similar electronic devices and systems, generally referred to as ICTs.

ICTs are very central to education technologies today. According to Ezekwesili (2008), today's technology innovations are mostly electronically based, the information and communication technology (ICT) revolution contributed almost all of the infrastructure improvements driving education, industry and economy all over the World from 1995 to date. That is why developed nations spend millions of dollars yearly to initiate and develop new technologies for education and the economy. Nigeria also recognize this and has implemented many ICT initiatives with clear intention to give her citizens ICT access and capacity building. Having identified most of these ICT initiative (Adesina and Odusami, 2012), this study sets out to find whether STE teachers across the country are aware of these variety of ICT initiatives and to determine their level of awareness.

Research Methodology

The research is a survey. The study targeted STTs of accredited science and technology programs in public tertiary institutions and secondary schools in Nigeria. The sample selection criteria, sample sources, sample selection process, and profile of study's participants are presented in this section. A general list of ICT initiatives in Nigeria earlier compiled by Adesina and Odusami (2012) was used. STTs who have taught science and

technology courses for more than two years on a Science or Technology program were the only ones that participated in the survey. Secondary schools, technical colleges and tertiary institutions selected, were public or government owned, running Science or Technology programmes and have full approval of accrediting authorities. Science and Technology programmes and subjects are taught at seven different educational levels in Nigeria. Five of them were covered in this research. 10 teachers from four Universities, four Polytechnics, four Colleges of education each; five students from four technical colleges and four secondary schools were randomly selected across the country for this work. A total of 160 teachers were selected as the sample for the research.

Research Instruments
A questionnaire was used as instrument for information retrieval and data collection. It was titled STTs Questionnaire. Questions on the questionnaire were structured along the line of teaching and research. It featured questions on: respondents' personal data, establishment information and respondents awareness of Nigeria's ICT initiatives among others. Respondents indicated their awareness or otherwise of each of Nigeria's ICT initiatives listed in the questionnaire respectively.

Validation and Reliability of Instruments
The instrument for this study was validated for content and face validity. It was administered to the selected STTs thereafter. Using the SPSS software, the Cronbach's α was computed to test the reliability of the four - point Likert scale used for this study. Cronback's alpha (α) reliability coefficient for STTs' questionnaire measuring scales is 0.956. The high coefficients obtained indicate that the four - point Likert scale used for measuring the level of awareness of Nigeria's ICT initiatives is reliable at the 5% significant level.

Data collection and Analysis
The researchers and their research assistants visited the selected institutions and organisations and met with and administered questionnaires on the STTs' institutions. The instruments were administered through direct contact, electronic mails (e-mail), postage and telephone. The data collected from the study were extracted and analyzed using qualitative means and descriptive statistics. For the ANOVA carried out in this study the SPSS software was employed through the discriminant analysis procedure of the package. In addition to the F statistics produced, the procedure also produces the levels of significance (p values). This enabled statistical significant differences between groups to be determined at 5% significance level.

RESULTS
This section presents the analyses of the data collected, results and major findings of the study
 based on the research questions that were earlier raised. The study identified 77 different ICT initiatives implemented by Nigeria between the year 2000 and 2011.

STTs' Awareness of Nigeria's ICT initiatives
A questionnaire with 60 Nigeria ICT initiatives enlisted was used to determine who is aware of the ICT initiatives and who is not. This section examines STTs' level of awareness of Nigeria's ICT initiatives. 60 identified Nigerian ICT initiatives were listed and the respondents were asked if they are aware of each one or not. The summary of the frequency analysis of the respondents on awareness of Nigeria's ICT initiatives is shown in Table 1 below.

Table 1: Awareness of Nigeria's ICT initiatives

Education Level	STTs	
	Aware	Not Aware
Secondary Schools	12 (60%)	8 (40%)
Technical Colleges	14 (70%)	6 (30%)
Colleges of Education	37 (92.5%)	3 (7.5%)
Polytechnics	33 (82.5%)	7 (17.5%)
Universities	33 (82.5%)	7 (17.5%)

Analysis of STTs' level of Awareness of Nigeria's ICT initiatives
A combination of mean response analysis, one-way analysis of variance (ANOVA) and frequency of responses were employed in analyzing the collected data. This aspect of the analysis attempts to evaluate STTs' level of awareness of Nigeria's ICT initiatives by ranking the mean response. It further examines their level of awareness of the ICT initiatives. Table 2 lists out 60 ICT initiatives of Nigeria within the period (2000 – 2011). It also ranks the STT's perception of the probability of awareness of the ICT initiatives.
From table 2, the overall mean shows that all the ICT initiatives listed have low probability of occurrence. Despite the large number of ICT initiatives identified by overall ranking, analysis based on the STTs' level of

awareness shows that significant difference of opinion exists in a few cases. The perception of no significant difference in STTs' awareness of Nigeria's ICT initiatives was tested using the ANOVA at 5%level of significance. Table 2 summarises the results of the analysis. Table 2 shows that opinions pertaining to eight of Nigeria's ICT initiatives have statistical significant difference ($p < 0.05$). These are computerization of laboratories, workshops or studios; ICT integration into sectors, community resource centers, interactive learning network, mobile internet units, mobile e-learning schools, one laptop per child project and e-books.

Causes of low or lack of awareness of Nigeria's ICT initiatives.
From literatures (Osofisan and Osunade, 2006; Aputu and Latham, 2009; etc.) and responses to the questionnaires administered on the STTs, the following were identified as causes of low awareness of Nigeria's ICT initiatives during the period 2000 -2011:

i.   Dearth of information the existence of the ICT initiatives
ii.   Secrecy in the package and implementation of the initiatives
iii.   Lack of interest
iv.   Low confidence in sincerity of government initiatives
v.   Lack of awareness of the potentials of the ICT initiatives by the targets
vi.   Lack of consultation / partnership with relevant professional bodies

Summary of Findings
None of Nigeria's ICT initiatives within the last twelve years (2000 – 2011) was specifically or exclusively designed or implemented for STTs. There was significant difference in STTs' opinions pertaining to eight and no significant difference pertaining to 52 of Nigeria's ICT initiatives regarding their awareness of the initiatives. This indicates the STTs are aware of the followings eight Nigeria ICT initiatives: computerization of laboratories, workshops or studios; ICT integration into sectors, community resource centers, interactive learning network, mobile internet units, mobile e-learning schools, one laptop per child project and e-books. The most popular Nigeria ICT initiative with the STTs is the computerisation of laboratories, workshop and studios initiatives. E-books have the least awareness among STTs. The analysis shows that STTs are not aware of the existence of many of Nigeria's ICT initiatives.

Discussion
In this section, the findings are highlighted, issues are raised, inferences and implications are discussed in the following order: awareness of ICT initiatives Nigeria has put in place in the last twelve years (2000 – 2011), the STTs' level of awareness of the initiatives the implications for science and technology education.
Awareness of Nigeria's ICT initiatives.
From the respondents in the secondary schools 60% of the teachers are aware of Nigeria's ICT initiatives 40% do not know of any of the initiatives. In the Technical colleges, 70% of the teachers are aware of Nigeria's ICT initiatives, 30% are not. At the Colleges of education, 92% of the teachers are aware of Nigeria's ICT initiatives, only 7% are not. In the Polytechnics, 82.5% of the teachers are aware of Nigeria's ICT initiatives, 17.5% said they do not know any of the initiatives. 82.5% of the university teachers indicated they are aware of Nigeria's ICT initiatives, 17.5% are not.

STTs' level of awareness of Nigeria's ICT initiatives.
Out of the 60 Nigeria ICT initiatives listed, the STTs were united in the opinions indicating that they were not aware of 52 . No statistical significant difference was observed in their opinions. The awareness level is generally below the benchmark of overall mean of 2.00. Table 2 indicates that Afara and SkoolTm curriculum which rank 1st and 2nd respectively. They were also ranked 1st and 2nd respectively under aware mean and not aware mean. National information infrastructure backbone which rank 6th overall and under aware mean were ranked 25th under not aware mean. There is a close proximity between the ranking of the overall mean and Aware mean of all the ICT initiatives listed except two – computer assembly plant, which rank 15th under aware mean and 9th overall, and policy initiatives with 24th under aware mean and 30th overall. E-books rank 60th overall, 60th under aware mean and 53rd under not aware mean. This illustrates there is a strong statistically significant difference in the opinions expressed by the STTs on this initiatives. In fact the p-values shows the most statistically significant difference on the entire list.

Implications for Science and Technology Education.
The implications of the findings of this study are:
1.   Since STTs are not aware of majority of Nigeria ICT initiatives they are not likely to make effort to access them or gain leverage for ICT capacity from them. Many ICT facilities are lying fallow, unused or underutilized in many places due to lack of awareness by STTs.
2.   The low awareness of ICT initiatives by STTs might have being due to some of the challenges that were identified in the study.

Table 2: Ranking of STTs Awareness on Nigeria's ICT initiatives

Nigeria's ICT Initiatives	Overall mean	Rank	Aware mean	Rank	Not Aware mean	Rank	F – Statistic	Level of Significance (p – value)
Afara	1.99	1	1.98	1	2.00	1	0.240	0.787
SkooolTm Curriculum	1.97	2	196	2	2.00	2	0.613	0.543
Solo Computer	1.96	3	1.95	3	1.96	7	0.170	0.844
Enabling technologies – Assistive/Support Technologies	1.94	4	1.93	5	2.00	3	1.141	0.322
Lagos Higher Education Connectivity Project (LHECP)	1.93	5	1.91	8	1.96	8	0.567	0.568
National Information Infrastructure Backbone (NIIB)	1.93	6	1.92	6	1.92	25	0.252	0.778
Tele Centre Network of Nigeria (TNN)	1.93	7	1.94	4	1.88	39	0.890	0.413
CT access network	1.91	8	1.91	9	1.92	27	0.358	0.700
Computer assembly plants	1.91	9	1.89	15	2.00	4	1.507	0.225
Enabling environment	1.91	10	1.90	13	2.00	5	1.426	0.243
Universal Service Provision Fund (USPF) Projects	1.91	11	1.92	7	1.92	27	1.812	0.167
Universities Bandwidth Consortium (UBC)	1.91	12	1.91	10	1.96	9	0.469	0.627
Universities Connect Project (UCP)	1.91	13	1.91	11	1.96	10	2.056	0.131
Classmate PCs	1.90	14	1.90	14	1.96	11	1.802	0.168
Digital Awareness Programs (DAP)	1.90	15	1.91	12	1.92	28	1.412	0.247
Intel® Teach** program	1.89	16	1.88	16	1.96	12	0.638	0.530
Internet Exchange Points (IXPs)	1.98	17	1.88	17	1.96	13	0.638	0.530
IT parks	1.89	18	1.88	18	1.96	14	1.153	0.318
Local content on the internet	1.89	19	1.88	19	1.92	29	0.149	0.868
National Rural Telephony Project (NRTP)	1.89	20	1.88	20	2.00	6	1.695	0.187
Telephone penetration	1.89	21	1.88	21	1.92	30	0.141	0.868
FEC approved ICTs for Universities (2007)	1.89	22	1.88	22	1.96	15	0.638	0.530
Computerization of Laboratory, Workshop or Studio	1.88	23	1.88	23	1.92	31	3.254	0.041*
ICT for Development (ICT4D) plan	1.88	24	1.83	34	1.88	40	0.027	0.973
NITDA's ICT Initiatives	1.88	25	1.87	25	1.96	16	0.798	0.452
Advance Digital Awareness Program for Tertiary Institutions (ADAPTI)	1.87	26	1.87	26	1.88	41	0.008	0.992
Computerize Nigeria	1.87	27	1.85	29	1.96	17	0.988	0.375
Eko Connect	1.87	28	1.84	33	1.96	18	1.698	0.186
ICT Integration into Sectors	1.87	29	1.87	27	1.96	19	3.654	0.028*
Policy Initiatives	1.87	30	1.88	24	1.83	50	0.886	0.414
Rural Information Technology Centres (RITCs)	1.87	31	1.85	30	1.92	32	0.909	0.404
School Net Nigeria	1.86	32	1.85	31	1.92	33	0.345	0.709
Community Resource Centre (CRC)	1.85	33	1.87	28	1.88	42	5.347	0.006*
Virtual Library Project (VLP)	1.85	34	1.83	35	1.96	20	1.316	0.201
Youth ICT Empowerment Summit - by Ovia Foundation	1.84	35	1.82	36	1.92	34	1.368	0.258
Personal Computer Ownership Scheme (PCOS)	1.83	36	1.85	32	1.79	54	2.044	0.133
Schools Connect (MTN Project)	1.83	37	1.81	39	1.96	21	1.691	0.188
Nigerian Universities Network (NuNeT)	1.82	38	1.81	40	1.92	35	3.249	0.109
Computers for All Nigerians Initiative (CANi)	1.81	39	1.82	37	1.79	55	1.348	0.263
Interactive Learning Network	1.81	40	1.82	39	1.88	43	3.839	0.024*
Broadband Infrastructure	1.81	41	1.77	46	1.92	36	2.348	0.099
Technology Resource Center (TRC)	1.80	42	1.80	41	1.88	44	1.567	0.212
Deregulation of the Telecoms Sector	1.80	43	1.78	43	1.88	45	1.546	0.216
Digital Broadcast	1.80	44	1.79	42	1.92	37	2.218	0.112
TETFund ICT Projects	1.79	45	1.75	48	1.96	22	2.723	0.069
Mobile Internet Units (MIU)	1.78	46	1.75	49	1.96	23	3.422	0.035*
Mobile E-learning Schools	1.78	47	1.78	44	1.92	38	3.968	0.021*
One laptop per child project	1.78	48	1.78	45	1.88	46	3.161	0.045*
Satellite Technology: NICOMSAT – 1,NICOMSAT -3	1.78	49	1.77	47	1.83	51	0.324	0.723
E – government	1.77	50	1.75	50	1.96	24	5.018	0.008*
Fibre optic cables	1.76	51	1.73	52	1.88	47	1.375	0.256
Internet Services – dialup, WiMAX	1.76	52	1.74	51	1.83	52	0.465	0.629
Open University ICT Initiative	1.71	53	1.71	53	1.79	56	1.750	0.177
STEP-B ICT Projects	1.69	54	1.65	56	1.88	48	2.896	0.058
Petroleum Technology Development Fund (PTDF) Projects	1.68	55	1.69	54	1.56	60	2.853	0.061
Computer Laboratories	1.66	56	1.67	55	1.71	58	2.403	0.094
Digital Libraries (an MTN project)	1.66	57	1.63	58	1.88	49	2.951	0.055
Distance Learning ICT Initiative	1.64	58	1.63	59	1.79	57	1.932	0.148
Cybercafés and Digital Malls	1.62	59	1.64	57	1.58	59	1.885	0.155
E – books	1.49	60	1.43	60	1.83	53	6.958	0.001*

*Significant at p < 0.05

Conclusions

The study reveals that the larger number of STTs were not aware of 52 of the ICT initiatives implemented by Nigeria between the 2000 and 2011 as identified in the study. This calls for a quick and effective awareness generating action from the initiators as well as the implementation agencies of these initiatives to address the situation.

Recommendations

Following our findings in this study the following actions are recommended:
1.   Educational bodies such as Science Association of Nigeria, Nigerian Union of Teachers, Nigeria Association for Educational Media and Technology, Educational associations and experts in the respective fields of study should be consulted and co-opted into the recommendation process as well as

the implementation stages of every ICT initiative in Nigeria to ensure its usefulness, adaptation and utilisation by the STTs in the schools and tertiary institutions.

2. Awareness campaign should be mounted for Nigeria ICT initiatives.
3. STTs and schools should be involved at the design stages of the ICT initiatives to guarantee relevance and patronage of the facilities when initiated.
4. Local awareness of the various ICT initiatives and potential benefits should be created.
5. Deliberate effort should be made to acquaint STTs with the existence and potentials of the other 52 ICT initiatives and usefulness in studying and learning communicated.
6. Organize seminars and demonstration workshops continuously to guide STTs to use internet access in a way that will enable it make essential impact on their teaching, research and career.

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