ABSTRACT

This study focused on promoting science-based academic research and community service delivery through ICT adoption. The descriptive survey research design was adopted for this study. The population for the study comprised the academic staff of School of Science, Federal College of Education (Sp.), Oyo drawn from the different departments of the School. The population for the study was fifty-seven (57) while the sample used was forty (40) males and female lecturers who ranked from Assistant Lecturers to Chief Lecturers. The simple random sampling technique was employed. A self-structured and validated questionnaire was used as the research instrument. Data collected were analysed using descriptive and Chi-square statistical analysis and results presented in tabular form. Results showed that tertiary science teachers are of the opinion that ICT adoption for the science-based academic research is a welcome development. It was also inferred that for community service providers, ICT adoption should be welcomed. The study indicated that adoption of ICT will facilitate wider access to current information for promotion of academic research and community service delivery. In addition to possibility of a variety of academic and research resources and materials, intra and inter-disciplinary collaborations will be fostered and this will by implication provide room for quality and depth of science – based academic research efforts. Conclusions were drawn and recommendations given including that Government and proprietors of tertiary institutions should provide necessary ICT infrastructures and needed support to enhance and sustain the adoption of ICT for research and community service activities.

Keywords: ICT Adoption, Devices, Science-based Academic Research, Community Service Delivery, Science Teachers
1. BACKGROUND TO THE STUDY

Generally, academic staff in tertiary institutions and in particular, Colleges of Education, are obligated by the conditions of service guiding the job, to undertake three aspects of primary assignment. These include teaching, research and community services. An excellent teaching coupled with research and qualitative community service records, is necessary for career progression as the competition and conditions to rise to the top become stronger by the day.

Kirschner and Weperies (2003) in Yusuf, Afolabi and Loto (2013), maintained that information and communication technology can make the school more efficient and productive, by organising a variety of tools to enhance and facilitate teachers’ professional activities. Also, Yusuf and Onasanya (2004 in Yusuf, Afolabi and Loto, 2013) opined that ICT provides opportunities for school to communicate with one another through e-mail, mailing list, chat room and other facilities. It provides quicker and easier access to more extensive and current information. ICT can also be used to do complex tasks as it provides researchers with a steady avenue for the dissemination of research reports and findings.

Onasanya, Shehu, Oduwaiye and Shehu (2010) observed that lecturers in tertiary institutions are involved basically in two things: teaching and research, with auxiliary administrative assignments. The ICTs have the potentials of not only ensuring effectiveness and efficiency in these two areas of teaching and learning; they have the potentials of easing the administrative duties. Citing the Organisation for Economic Co-operation and Development (2005) and Gbenga (2006), they further submitted that ICT can work in a number of general ways:

i. It can be used to help in school administration.
ii. It can be used to train students in skills which they will need in further education and as an ongoing learning process throughout the rest of their lives and for their future jobs, e.g., word processing, email communications etc.
iii. It can provide access to information and communication outside the classroom e.g., via the Internet.
iv. It can be used to support teacher development via external networks.
v. It can support and potentially transform the learning and teaching process.

Archibong and Effiom (2009), from the result of a survey which explored ICT usage and challenges among academic staff found that ICT is of much help to academic staff in the areas of upgrading of knowledge, research and publication. However, weak infrastructure, financial constraints and lack of access to ICT facilities were identified as the major obstacles to ICT usage. Furthermore, designing of new learning activities, electronic presentation of materials and making use of internet were identified as their areas of training need in ICT usage.

Ankamah, Akussah and Adams (2018) submitted that the application of ICT in research has caused significant transformation in our modern world not only because it helps to save time and money used during and after research, but it also reduces the difficulty in working with big data or information resources which were impossible in the past. Also that the application of ICT in research has equipped researchers in the University of Cape Town (UCT) with world-class expertise and facilities in the: collection and management of research data; modelling, simulation and data processing through high-performance computing; comprehension of big data through visualisation and data science techniques; dissemination of research outcomes (including data and workflows); promotion of collaborative research through virtual labs and cloud resources; and the development of customised research software, hardware and services.
According to Emory University’s (2016) online definition, community services are services that are identified by an institution of higher education through formal or informal consultation with local, non-profit, government and community based organizations as designed to improve the quality of life of community residents, particularly low-income individuals or to solve particular problems related to their needs. Community service is a non-pay job performed by one or a group of people for the benefit of the community or its institutions (Wikipedia, 2019). Community engagement of staff and students is also an expression of the corporate citizenship of the University (institution) (Butcher, Howard, Labone, Bailey, Smith and Mc Fadden, 2010). Thus, it helps the teachers or staff to fit into the social life of the community and society at large which in turn, enhances their commitment to national objectives.

Jacob, Sutin, Weidman and Yeager (2015) observed that while core higher education functions have traditionally centered on (1) research and innovation, and (2) teaching and training, a third area of essential note is the role HEIs play in community development. It is now commonplace for annual evaluations of faculty members to include a review of scholarship contributions, teaching performance, and community service. Bailey, Burke, Weeke and James (2014) noted that University-community engagement has been seen as beneficial to both the university and related communities through areas such as support to community development, and the increase in diversity of students and education options. While there continues to be much variation and some debate on the definition of university-community engagement and the complexities associated with its implementation, university-community engagement continues to be a central pillar of many universities’ strategic plans.

The use of information and communication Technology (ICT) in education has become a priority in the last decades and especially in the 21st century. The adoption of ICT over the years in education has allowed for better and effective service delivery electronically. ICT no doubt enhances research capacity. Its application in education seeks ways to serve people, businesses, governments, education and community members. ICT could arguably be said to have received global acceptance. As opined by Antonio, Astin and Cress (2000), though Colleges and Universities have demonstrated growing interest in the inclusion of civic engagement, more work needs to be done to make this a more sustainable reality.

According to Ssewnyana and Busler (2007) cited by Ogwuegbu and Araoye (2015), the adoption and usage of ICT follows the same pattern in all countries; the difference lies in the level of usage, with the developed countries performing better that their developing countries counterparts. In Nigeria, ICT is in increasing usage among educational institutions. The nation recognizes the vital role ICT is to play in enhancing the education of her citizens which made Nigeria to put in place a National Policy on Information and Communication Technology in Education (2010) with the mission of meeting the human resource demands of the nation for attaining and enhancing sustainable socio-economic development, global competitiveness as well as the individual’s capacity to survive in a contemporary environment. The nation, being a developing one still faces some difficulties in satisfactorily adopting ICT in education. Some of these challenges are in the areas of regulation, curriculum, institutional and administrative capacity, efficiency and effectiveness in the use of ICT, equity issues, research and funding.

EdTechReview (2019), referring to Balanskat, Blamire and Kefala (2006), on the Advantages of Using ICT in Learning-Teaching Processes stated that,

a) ICT has positive impact on students’ performance in primary schools (and higher education), pupils are more motivated when computers and internet are being used in class. It helps them to do assignment.

b) It helps to reduce the social disparities between pupils.
c) It helps students assume responsibilities when they use ICT to organize their work through digital portfolios or projects.

d) ICT has significant impact on teachers and teaching processes. Teachers use ICT to do tasks; helps teachers to work in teams and share ideas related to school curriculum; use of broadband and interactive white boards play a central role in fostering teacher's communication and increasing collaboration between educators. Teachers use ICT to support innovative pedagogy (and research) such as video conferencing. Digital video and virtual learning environment are now being incorporated, providing evidence of ongoing learning by the workforce.

e) By virtue of government Interventions and training seminars organized ..., ICT tools stimulate teachers. Indeed, an absolute majority of teachers in Europe (90%) claim to use ICT to do tasks, such as preparing lessons, sequencing classroom activities, etc. Therefore, teachers plan their lessons more efficiently.

Community service delivery to students, such as enrollment, examination, result, feedback, requests for documents, request for certificates, issuing admit cards, ID cards, forums and charts; Institutional services, like mail delivery, memos, committee assignments and other extra curricula activities and services to the outside College communities such as traffic warden services, community development projects participation, provision of distant learning and literacy training, public awareness, campaign services, public health services, security services, support service for the persons with special needs etc, can be greatly improved upon through ICT adoption. For instance, use of text messages, e-mails, internet facilities, social media, e-prints, requires ICT tools while ICT devices like projector, closed circuit television, microscopes, interactive boards, etc are greatly needed in the school environment. In agreement with FME (2010), cited by Ebhomien, Oriahi, Okogwa and Ebhomien (2014), Information System is of paramount importance to the future of education. IS or ICT adoption will widen access to education and the range of instructional options and opportunities for anywhere, anytime, any-pace and any-path learning. ICT has the capacity to handle quality of data for processing with fastest speed and as well aid in planning community service delivery.

1.1 Statement Of The Problem

ICT devices are very useful tools to have for research work and community service delivery. There are endless possibilities interacting with ICT devices other than just typing or surfing the web or phones for just calling and text messages. ICT, for Academic activities, reduces paper work, saves time and cost, allows for global collaboration, validation, peer review and use of e-library. It allows for easy presentation of research works (e.g. power-point, virtual presentations/e-conferencing and online student/supervisor relationship). However, as good and promising as the deployment of ICT in tertiary education is, there are much resistance slowing down the use of this vital educational tool. This could be because of the natural disposition of people to resist change especially when it is sudden or if they were not carried along and ofcourse, where it disrupts their traditional lifestyle and long-held beliefs or values.

Therefore, in order to pursue academic excellence in science-based and improved community services, the disposition of tertiary science teachers on ICT adoption is paramount. In furtherance of this, the present study sets out to examine the opinion of tertiary science teachers on promoting science-based academic research and community service delivery through ICT adoption using the Federal College of Education (Special), Oyo as a case study.
1.2 Objective Of The Study
The main objective is to find out tertiary science teachers’ opinion on promoting science-based academic research and community service delivery through ICT adoption with the view to pursue excellence for global impact.

1.3 Hypotheses
To accomplish the study objective, two hypotheses were formulated as follows:

H01: There is no significant role of ICT in science-based academic research.

H02: There is no significant effect of ICT on community service delivery.

2. METHODOLOGY

2.1 Research Design
The descriptive survey research design was adopted for this study. The population for the study comprised the academic staff of School of Science, Federal College of Education (Sp.), Oyo drawn from different departments – Biology, Chemistry, Computer Science, Integrated Science, Mathematics and Physical and Health Education. The population for the study was fifty-seven (57) out of which forty (40) males and female teaching staff ranking from Assistant Lecturers to Chief Lecturers were sampled through simple random sampling technique to participate in the study. A self-structured and validated questionnaire was used as the research instrument. It was composed of two parts. The Part A elicited information of the demographic variables of the respondents while the Part B covered the items generated based on the research hypothesis. A 4-point Likert-scale of Strongly Agree (SA), Agree (A), Disagree (D), Strongly Disagree (SD) was used to rate the responses. Data collected were analysed using descriptive and Chi-square statistical analysis and results presented in tabular form.

3. DATA PRESENTATION

The completed questionnaire were sorted and arranged and data collected were subjected to statistical analysis as presented in the results.

Table 1: Descriptive Statistics of Respondents by Gender and Ranks

<table>
<thead>
<tr>
<th>Gender</th>
<th>Rank of Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Chief Lect.</td>
</tr>
<tr>
<td>Male</td>
<td>26</td>
</tr>
<tr>
<td>Female</td>
<td>14</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
</tr>
</tbody>
</table>

Demographic data presented in the Table above reveals that responses were drawn from a cross section of the teachers’ population indicating a variety of ranks. This agrees with the choice of descriptive survey employed. For the gender, 65% were males while 35% were females. The perceptions of the teachers however, were not gender biased.
4. RESULTS AND DISCUSSION OF FINDINGS

Inferential Statistics

Table 2 - Hypothesis H0: There is no significant role of ICT science based academic research

<table>
<thead>
<tr>
<th>Group</th>
<th>Size</th>
<th>Df</th>
<th>α - level</th>
<th>χ² tab</th>
<th>χ² cal</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agree</td>
<td>191</td>
<td>12</td>
<td>0.05</td>
<td>21.026</td>
<td>24.21</td>
<td>Significant</td>
</tr>
<tr>
<td>Disagree</td>
<td>06</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Reject H0</td>
</tr>
</tbody>
</table>

Decision Table 1 above, showed that, majority of the respondents disagree with the null hypothesis tested at 0.05 level of significance as indicated by the Chi-calculated of 24.21, which is greater that Chi-calculated. This implies that ICT is significant to any science based academic research activity.

Table 3 - Hypothesis H0: There is no significant effect of ICT on community service delivery.

<table>
<thead>
<tr>
<th>Group</th>
<th>Size</th>
<th>Df</th>
<th>α - level</th>
<th>χ² tab</th>
<th>χ² cal</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agree</td>
<td>185</td>
<td>12</td>
<td>0.05</td>
<td>21.026</td>
<td>22.51</td>
<td>Significant</td>
</tr>
<tr>
<td>Disagree</td>
<td>11</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Reject H0</td>
</tr>
</tbody>
</table>

From the table 2, the calculated Chi-square value (22.51) falls outside the acceptable region of Chi-tabulated (21.026). Therefore the null hypothesis H0 was rejected. This goes to mean that ICT has significant effect on community service delivery.

5. CONCLUDING REMARKS

From the above findings, it is clear that tertiary institution science teachers are of the opinion that ICT adoption for science-based academic research is a welcome development. It is also inferred that for community service providers, ICT adoption should be welcomed. Conclusively, as reflected in the general view of science teachers in this study, adoption of ICT will facilitate wider access to current information on recent development in the field of study - promotion of academic research and community service delivery. In addition to possibility of a variety of academic and research resources and materials, intra and inter-disciplinary collaborations will be fostered and this will by implication provide room for quality and depth of science - based academic research efforts.

In the same vein, ICT adoption in community services, will allow a wider audience to be reached by the service providers. It will enhance the content of services to be delivered; it will save the cost of service delivery and encourage feedback mechanism. Its adoption will also aid in planning community service delivery among tertiary science teachers. With this, tertiary institutions will be positioned to better fulfill their mandate of research and community service.
6. RECOMMENDATION

In view of the results of the study, it is recommended as follows:

1. Government and proprietors of tertiary institutions should provide necessary ICT infrastructures and needed support to enhance and sustain the adoption of ICT for research activities.

2. There is need for provision of more awareness and training opportunities to reduce if not completely eliminate the apathy and sometimes resistance to the deployment of ICT in tertiary institutions.

3. More emphasis should be placed on community engagements by higher institutions and with the adoption of ICT to make it far reaching and impactful.

REFERENCES


