Assessment of Knowledge and Utilization of Information and Communication Technologies for Teaching and Learning of Electrical and Electronic Subjects in the Technical Colleges of Ebonyi State

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Abstract
This survey research assessed the level of usage of Information and communication technologies (ICT), in teaching and learning of electrical and electronic subjects in Ebonyi State technical colleges. Specifically, the awareness of ICT components among teachers and students, the availability of ICT resources to the technical colleges, the extent of usage of ICT among teachers and students and the application of ICT to school teaching and learning were studied. Four research questions and two null hypotheses guided the study. Population of the study was 437 comprising of 48 teachers and 389 electrical and electronics students of the four technical colleges in Ebonyi state. Due to population size, all the teachers were sampled while simple random sampling technique was used to select a total of 130 students from the three senior classes of the four technical colleges. A five-point Likert type questionnaire was used for data collection. Mean statistic and standard deviation were used to answer the research questions while t-test and analysis of variance were used to test the null hypothesis at a 0.05 level of significance. Results showed that ICT were not fully utilized in the teaching and learning of electrical and electronic subjects in Ebonyi state.

Key words: ICT, Electrical and Electronics, Technical College, Teaching and Learning, Utilization

Introduction
Teaching and learning is all about communication between the teacher and the learner. Teaching can be seen as a process of giving information, while learning is a process of receiving and synthesizing information. That is why a learned person is said to be informed. Since the evolution of Information and Communication Technologies (ICT), the giving and receiving of information have not remained the same. Information and communication technologies in today’s world refers to those tools that determine the efficiency and effectiveness with which we communicate and the devices that allow us to handle information (National Open University 2012). ICT is not synonymous with Computers. However, ICT include computers. ICT in education encompasses a great range of rapidly evolving technologies such as desktops, notebook and handled computers; digital cameras; local area networking; the internet and the world wide web; CD ROMs and DVDs; and applications such as word processors; spreadsheets; tutorials; simulations; electronic mails; digital libraries; computer mediated conferencing; video conferencing; and virtual reality. (Ugwu & Oboegbulem (2011). Information and Communication Technologies also includes projectors, radio, television, telephone and other equipment with their accessories and applications that help to pass messages from a message sender to the intended receiver without undue distortion.

We utilize ICT in teaching and learning when they are brought to bear in passing information to learners by the teacher. By introducing ICT to teaching and learning, students are exposed to and interact with other expert learners and other novice learners to develop understanding and further their knowledge. They do not have to rely on the limitations of one teacher; they can interact with peers and other experts to gain new information and to intensify their knowledge base. It helps the students study independently and experience discovery learning. Students’ learning is made more robust and their knowledge and understanding increases where ICT is used in ways that promote learners to work together and where the teacher is less high-minded (Selinger 2005). ICT have the capacity to solve the problem of illiteracy and perks up the quality of education at all levels, through multimedia tools such as simulations and models and other projections.
Effective use of ICT in schools guarantees more access to information and experience in this era of globalization (Ugwu & Oboegbulem, 2011). In other words, there is an important link between education and ICT in a knowledge seeking society, like ours, in order to meet the challenges of the 21st century. Information and communication technologies have brought about a “personalized, just-in-time, up-to-date and user-centred educational activities” into the global teaching and learning processes (Haddad & Draxler, 2002, p. 12). It can enhance learners’ understanding of precepts that they previously may have considered very difficult. “For any teacher at any level to be able to contribute to national development in this global world, he/she must be empowered to provide Information and Communication Technology-based training for the students (Ajeyalemi, 2005:5). Thus his/her education must provide opportunities to acquire skills in the selection, application and use of ICT tools and materials”.

Using ICT in teaching and learning may be approached in three ways: learn about ICT, learn through ICT and learn with ICT (Gannon, 2004).

![Fig.1. Approaches to the Use of ICT for Teaching and Learning](image-url)

Utilization of ICT begins the provision of equipment and accessories. This is followed by learning about ICT and when one is acquainted with ICT, he/she will either learn with ICT or learn through ICT or both. All these processes are made possible through ICT tools. The process can also be cyclic since learning with or through ICT can also demand a new knowledge and skills. Such a skill can also lead to acquisition of new or modern ICT tools. The need for acquisition of ICT tools can also be discovered by the application of ICT in teaching and learning. The ICT tools normally used for teaching and learning include Audicassette players/tapes, Radio, Videotapes, CD-ROM, DVD ROM, Digital Cameras, Multimedia, Internet/World Wide Web, Audio Conferencing, Audio Graphics, Interactive Television, Video Conferencing, and Wireless Technology, Radio Cassette Player among others. Some of the terminologies that denote the
utilization of ICT include: Computer-Assisted Instruction (CAI), Computer-Assisted Training (CBT), Computer-Based Learning (CBL), Internet-Based Learning (IBL), Web-Based Training (WBT) and Electronic Learning (E-Learning) (Ugwoke 2011).

It is true that Information and Communication Technologies offer teachers and students educational tools and resources which broaden their learning environment. When used in line with the aims, principles and objectives of the National Board for Technical Education (NBTE) benchmarks, these technology tools have the potential to enhance and transform classroom teaching and learning. Without teachers’ belief and commitment to using ICT and their efforts to find effective ways of integrating the technology into their teaching, continued increases in expenditure will have little impact on classrooms (Selinger 2005). Many research reports agree that for effective use of ICT, teachers need to be well confident and familiar with the technology - they have to perceive a reason to use it and be convinced of the benefits (Selinger 2005). Computers have to be easily accessible, case studies of good practice need to be available, and teachers ought to facilitate the development of increased student autonomy and offer opportunities for valid learning. Few of ICT tools are discoursed below

Internet/ World Wide Web: The internet is a communication network among computers. It allows you to locate and retrieve information on other computers linked to the internet elsewhere (Aston 2003). Internet use has expanded greatly and is now an accepted part of life for many people. The Internet and World Wide Web (WWW) is also a powerful resource for teaching and learning, opening up a remarkable range of resources. The Internet has three identifiable uses for schools (Adomi & Kpangban 2010).

- An information bank: the WWW can be compared to a vast library which can be accessed by teachers and children using information retrieval skills. It can provide resources including curriculum-related content, planning ideas for teachers, and information on education and schooling issues. Additionally, a wide range of material and software can be downloaded from the Internet;
- To enhance communication both locally and globally, between schools, teachers and students through e-mail, electronic conferencing and video conferencing;
- To afford an enablement for publishing school work on the World Wide Web, stimulating communication between schools, children, parents and others.

The Internet provides schools with a latest and innovative channel of communication. The Internet also provides access to a range of online collaboration tools, including e-meetings and discussion boards, which teachers can use to collaborate with colleagues in other schools. Additionally, using the Internet as a learning resource supports the practical approach to learning espoused in the secondary Curriculum, which acknowledges that students should be guided in the line of cognitive, affective and psychomotor domain of learning. The Internet can also add a virtual dimension to the child’s learning, breaking down barriers of remoteness and inaccessibility when the real or actual experience is unavailable.

Electronic Mail: E-mail is a method to send and receive among people with e-mail addresses as well as other networks with mail connections to the internet. Through the use of e-mail, it is now possible to send messages containing text, pictures and sound to anywhere in the world. It is also possible for children to videoconference with their peers in other schools in Ireland and elsewhere. An e-mail project can be set up between two or more partners – individuals, groups, classes or schools who are studying the same topic. Projects using email work best when there is an area of common interest between the partners in the project.

Video Conferencing: Video-conferencing enables teachers and children to communicate at a distance with teachers and children in other schools, either nationally or internationally. This is done by attaching a camera to a computer and using either the Internet or high-speed telephone lines. Video-conferencing can be used in education to; link a geographically secluded school to other schools, for specific subjects, or for sharing of ideas and projects; permit teachers working in inaccessible rural schools to exchange and build up their proficiency in planning and exchanging resources; among other benefits.

Governments and other agencies all over the globe have been committing valuable resources to put curriculum materials online and to encourage the use of ICT in the classroom (UNESCO 2010). Nigeria may not have been completely left behind in this process. The first policy on ICT application on Nigerian schools was made in 1988 (FGN 2002). SchoolNet
Nigeria was launched in September 2001 with the support of the Ministries of Education, Telecommunications, Science and Technology and the Education Tax Fund in a partnership with some public and private sector interests. SchoolNet Nigeria is a non-profit organization created to address the education sector in Nigeria, and mobilize both human and financial resources for the purposes of using ICT in the secondary education level. A key activity is the DigiNet project, which has established computer labs in 35 schools, and is being expanded in a second phase. SchoolNets promote the development of knowledge societies by connecting schools to the Internet, building connections among students, teachers and schools, sharing information and resources and supporting e-learning in online, networked environments. The institution of Nigerian National Policy on Information Technology stems from understanding ICT as an instrument that can enable the nation have access to the delivery of quality education and so help in improving the living standard of the populace (FGN 2002). This project was specifically geared towards the revolutionalization of Nigerian educational system at all levels and sectors to put it abreast of the present global age through the use of ICT. Towards achieving this, it was intended to equip all schools in Nigeria with computers and communications technologies. SchoolNet Nigeria, and Microsoft’s Africa School Technology Innovation Centre (STIC), has organised a workshop to provide new skills to Partners in Learning (PIL) trainers and teachers at the Government Technical colleges in Tudun Wada, Abuja (The Nation Newspapers 2010, February, 15).

In the same vein, Intel Corporation, in partnership with Schoolnet Nigeria has trained over 10,000 teachers in Nigeria, on technology integration into classroom instruction under its Intel Education Programme, which started in the year 2006 (National Accord Newspapers 2011, December 4th). In 2010, about 30 ICT units were facilitated in Delta State by Schoolnet Nigeria. All these were geared to impact on both junior and senior secondary teachers and students. Schoolnet’s objectives to include: develop local, state and national ICT in education capacity; suggest distance education and teacher development through the use of ICT implement training for educators to use technology to enhance teaching and learning; address the shortage of technical ICT skills (Ugwu & Obogbulem 2011). On the July 17, 2011, a new Ministry of Communication Technology was created and charged with producing an ICT policy in Nigeria. But on August 25, 2011, an ad hoc committee to harmonize the various laws dealing with ICT was inaugurated. They came up with a 55 page National Information Communication Technology Policy Draft by the Ministerial Committee on ICT Policy Harmonization, dated January 9, 2012 (Akpodiete 2012).

According to Aggeliki, (2010), electrical technology deals with all machines, tools, devices, and systems in which a current or a flow of electrons takes place through conductors and metals. It involves the design and development of high-voltage systems and components such as motors, generators, heaters, electrical power transmission and distribution systems, radio wave and optical systems, converters, and control systems for operating light and heavy machinery. Almost all of our low or high-tech gadgets today involve the use of electrical current to operate, making electrical energy one of the most needed sources of power the world over. On the other hand, electronic technology is one of the principal branches of electrical engineering which deals with science and technology based on and concerned with the controlled flow of electrons or other carriers of electric charge, especially in semiconductor devices (Collins, 2005).

**Problem of the Study**

Efforts have been made to ensure that ICT are available and used in Nigerian technical colleges, though the level of uptake is still not too high. Newhouse (2002) held that ICT literacy has enhanced teaching and learning through its dynamic, interactive and engaging content, and has provided real opportunities for individualized instruction. However, findings indicated that the use of computers by academics was more on statistical analysis than on teaching, Okon and Jacob (2002). Where is Ebonyi State in this digital map? What is the extent of the utilization of ICT in the teaching and learning of electrical and electronic subjects in Ebonyi State technical colleges? The problem of this study centred on how to obtain valid and reliable answers to the questions necessary to position Ebonyi State in the global ICT driven societies. Qualitative data collected on ICT utilization in the classroom will give a more accurate picture of how prepared the State is in facing the dynamic challenges of technology in this 21st century.

**Research Questions**

1. What is the level of familiarity of electrical and electronics teachers and students with ICT concepts and components in Ebonyi State technical colleges?
2. What is the availability of ICT facilities in the department of electrical and electronics in Ebonyi State technical colleges?
3. What is the level of utilization of ICT for leisure among electrical and electronic teachers and students in technical colleges of Ebonyi State?

4. What is the level of utilization of ICT for teaching and learning of electrical and electronic Subjects in Ebonyi State technical colleges?

**Hypothesis**

**Ho1:** There is no significant difference between the mean responses of teachers and students on the utilization of ICT for teaching and learning of electrical and electronic subjects in Ebonyi State technical colleges.

**Ho2:** There is no significant difference in the mean responses of technical college one, two, three and four on the utilization of ICT for teaching and learning of electrical and electronic subjects in Ebonyi State technical colleges.

**Methods**

This is a survey research. Population of the study was 437 comprising of 48 teachers and 389 electrical and electronics students of the four technical colleges in Ebonyi state. A total of 178 respondents were sampled for the study. Due to the population size, all the teachers were sampled while simple random sampling technique was used to select a total of 130 students from the three senior classes of the four colleges. A structured five-point Likert type questionnaire was adopted for data collection. Four research assistant were used to distribute and retrieve the questionnaires. Statistic Mean was used to answer research questions and items with 3.50 and above were accepted. But t-test and analysis of variance were used to test the null hypothesis at a 0.05 level of significance. T-test was used to find the significant difference between the mean response of teachers and students on the utilization of ICT for teaching and learning of electrical and electronic subjects, while ANOVA was used to find the significant difference in the mean responses of the four technical colleges.

**Presentation of Results**

Table 1, showing the level of familiarity of electrical and electronic teachers and students with ICT concepts and components in Ebonyi State technical colleges

<table>
<thead>
<tr>
<th>S/N</th>
<th>ITEM</th>
<th>XT</th>
<th>REMARKS</th>
<th>XS</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GSM mobile phone</td>
<td>4.67</td>
<td>Familiar</td>
<td>4.71</td>
<td>Familiar</td>
</tr>
<tr>
<td>2</td>
<td>Computer</td>
<td>4.31</td>
<td>Familiar</td>
<td>4.53</td>
<td>Familiar</td>
</tr>
<tr>
<td>3</td>
<td>Digital Camera</td>
<td>3.54</td>
<td>Familiar</td>
<td>3.54</td>
<td>Familiar</td>
</tr>
<tr>
<td>4</td>
<td>Power Point</td>
<td>2.98</td>
<td>Not Familiar</td>
<td>3.01</td>
<td>Not Familiar</td>
</tr>
<tr>
<td>5</td>
<td>Website</td>
<td>3.50</td>
<td>Familiar</td>
<td>3.13</td>
<td>Not Familiar</td>
</tr>
<tr>
<td>6</td>
<td>Electronic Mail</td>
<td>3.57</td>
<td>Familiar</td>
<td>4.04</td>
<td>Familiar</td>
</tr>
<tr>
<td>7</td>
<td>Input Device</td>
<td>3.30</td>
<td>Not Familiar</td>
<td>3.58</td>
<td>Familiar</td>
</tr>
<tr>
<td>8</td>
<td>Internet</td>
<td>3.55</td>
<td>Familiar</td>
<td>3.74</td>
<td>Familiar</td>
</tr>
<tr>
<td>9</td>
<td>Output Device</td>
<td>2.91</td>
<td>Not Familiar</td>
<td>4.54</td>
<td>Familiar</td>
</tr>
<tr>
<td>10</td>
<td>Networking</td>
<td>2.94</td>
<td>Not Familiar</td>
<td>3.01</td>
<td>Not Familiar</td>
</tr>
<tr>
<td>11</td>
<td>Search Engine</td>
<td>3.09</td>
<td>Not Familiar</td>
<td>2.78</td>
<td>Not Familiar</td>
</tr>
<tr>
<td>12</td>
<td>Scanner</td>
<td>2.71</td>
<td>Not Familiar</td>
<td>4.24</td>
<td>Familiar</td>
</tr>
<tr>
<td>13</td>
<td>CD Rom</td>
<td>3.51</td>
<td>Familiar</td>
<td>3.89</td>
<td>Familiar</td>
</tr>
<tr>
<td>14</td>
<td>World Wide Web</td>
<td>2.59</td>
<td>Not Familiar</td>
<td>4.04</td>
<td>Familiar</td>
</tr>
<tr>
<td>15</td>
<td>Video Conferencing</td>
<td>2.98</td>
<td>Not Familiar</td>
<td>3.59</td>
<td>Familiar</td>
</tr>
<tr>
<td>16</td>
<td>Microsoft Word</td>
<td>3.43</td>
<td>Not Familiar</td>
<td>4.44</td>
<td>Familiar</td>
</tr>
<tr>
<td>17</td>
<td>Download</td>
<td>2.64</td>
<td>Not Familiar</td>
<td>3.50</td>
<td>Familiar</td>
</tr>
<tr>
<td>18</td>
<td>USB</td>
<td>2.96</td>
<td>Not Familiar</td>
<td>3.43</td>
<td>Not Familiar</td>
</tr>
<tr>
<td>19</td>
<td>Chatting</td>
<td>3.13</td>
<td>Not Familiar</td>
<td>3.62</td>
<td>Familiar</td>
</tr>
<tr>
<td>20</td>
<td>Upload</td>
<td>2.91</td>
<td>Not Familiar</td>
<td>3.02</td>
<td>Not Familiar</td>
</tr>
<tr>
<td>21</td>
<td>Virtual Reality</td>
<td>0.21</td>
<td>Not Familiar</td>
<td>0.28</td>
<td>Not Familiar</td>
</tr>
</tbody>
</table>

The data in table 1 revealed that only seven out the 21 components of ICT are known to the teachers, while the students are acquainted with 14 of the components. GSM and computer rank high in the ICT facilities that both teachers and
students are familiar with. This may result from the fact that mobile phones and computers are available in different shops and offices. Unfortunately, processes of using computer for communications are rated very low.

Table 2, showing the availability of ICT facilities in electrical and electronic department of Ebonyi State technical colleges?

<table>
<thead>
<tr>
<th>S/N</th>
<th>ITEMS</th>
<th>XT</th>
<th>REMARKS</th>
<th>XS</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>21</td>
<td>Computers</td>
<td>2.65</td>
<td>Unavailable</td>
<td>2.77</td>
<td>Unavailable</td>
</tr>
<tr>
<td>22</td>
<td>Internet Access</td>
<td>2.39</td>
<td>Unavailable</td>
<td>2.58</td>
<td>Unavailable</td>
</tr>
<tr>
<td>23</td>
<td>Physical Structure</td>
<td>2.79</td>
<td>Unavailable</td>
<td>3.03</td>
<td>Unavailable</td>
</tr>
<tr>
<td>24</td>
<td>Projectors</td>
<td>2.51</td>
<td>Unavailable</td>
<td>3.06</td>
<td>Unavailable</td>
</tr>
<tr>
<td>25</td>
<td>Projection Screen</td>
<td>2.55</td>
<td>Unavailable</td>
<td>2.92</td>
<td>Unavailable</td>
</tr>
<tr>
<td>26</td>
<td>Television Sets</td>
<td>2.79</td>
<td>Unavailable</td>
<td>2.97</td>
<td>Unavailable</td>
</tr>
<tr>
<td>27</td>
<td>DVD/VCD Players</td>
<td>3.02</td>
<td>Unavailable</td>
<td>2.96</td>
<td>Unavailable</td>
</tr>
<tr>
<td>28</td>
<td>Radio Cassette Players</td>
<td>2.45</td>
<td>Unavailable</td>
<td>3.02</td>
<td>Unavailable</td>
</tr>
<tr>
<td>29</td>
<td>Printers</td>
<td>2.40</td>
<td>Unavailable</td>
<td>2.77</td>
<td>Unavailable</td>
</tr>
<tr>
<td>30</td>
<td>Digital Cameras</td>
<td>2.22</td>
<td>Unavailable</td>
<td>3.06</td>
<td>Unavailable</td>
</tr>
<tr>
<td>31</td>
<td>Power Supply</td>
<td>3.49</td>
<td>Unavailable</td>
<td>3.58</td>
<td>Available</td>
</tr>
<tr>
<td>32</td>
<td>Scanners</td>
<td>2.05</td>
<td>Unavailable</td>
<td>3.09</td>
<td>Unavailable</td>
</tr>
<tr>
<td>33</td>
<td>Routers</td>
<td>2.52</td>
<td>Unavailable</td>
<td>2.71</td>
<td>Unavailable</td>
</tr>
<tr>
<td>34</td>
<td>Cooling System</td>
<td>2.20</td>
<td>Unavailable</td>
<td>2.63</td>
<td>Unavailable</td>
</tr>
<tr>
<td>35</td>
<td>UPS</td>
<td>2.34</td>
<td>Unavailable</td>
<td>3.13</td>
<td>Unavailable</td>
</tr>
<tr>
<td>36</td>
<td>Server</td>
<td>2.50</td>
<td>Unavailable</td>
<td>2.77</td>
<td>Unavailable</td>
</tr>
</tbody>
</table>

Table 2 above showed that only power supply source was rated available by students for the utilization of ICT for teaching and learning in Ebonyi State technical colleges. Power supply could come from national grid or small generating sets. Therefore, infrastructural position of technical colleges in Ebonyi state was not encouraging for effective utilization of ICT. This results from the unavailability of ICT facilities in schools.

Table 3, showing the level of utilization of ICT for leisure among electrical and electronic teachers and students of Ebonyi State technical colleges?

<table>
<thead>
<tr>
<th>S/N</th>
<th>ITEMS</th>
<th>XT</th>
<th>REMARKS</th>
<th>XS</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>37</td>
<td>Text Message</td>
<td>3.63</td>
<td>Used</td>
<td>4.60</td>
<td>Used</td>
</tr>
<tr>
<td>38</td>
<td>E-mail</td>
<td>3.78</td>
<td>Used</td>
<td>3.76</td>
<td>Used</td>
</tr>
<tr>
<td>39</td>
<td>Chatting</td>
<td>2.25</td>
<td>Not Used</td>
<td>3.77</td>
<td>Used</td>
</tr>
<tr>
<td>40</td>
<td>Facebook</td>
<td>2.86</td>
<td>Not Used</td>
<td>3.57</td>
<td>Used</td>
</tr>
<tr>
<td>41</td>
<td>Internet browsing</td>
<td>3.58</td>
<td>Used</td>
<td>3.71</td>
<td>Used</td>
</tr>
<tr>
<td>42</td>
<td>Video Conferencing</td>
<td>2.18</td>
<td>Not Used</td>
<td>2.56</td>
<td>Not Used</td>
</tr>
<tr>
<td>43</td>
<td>Audio Conferencing</td>
<td>3.28</td>
<td>Not Used</td>
<td>3.60</td>
<td>Used</td>
</tr>
<tr>
<td>44</td>
<td>DVD Players</td>
<td>3.96</td>
<td>Used</td>
<td>4.25</td>
<td>Used</td>
</tr>
<tr>
<td>45</td>
<td>Radio Cassette Players</td>
<td>4.29</td>
<td>Used</td>
<td>4.15</td>
<td>Used</td>
</tr>
<tr>
<td>46</td>
<td>Television Sets</td>
<td>3.82</td>
<td>Used</td>
<td>4.28</td>
<td>Used</td>
</tr>
</tbody>
</table>

Table 3 indicated that both teachers and students use some ICT facilities normally in their daily activities such as leisure. Therefore so many people can attest to the benefit of ICT in this modern communication era.
Table 4, showing the level of utilization of ICT for teaching and learning of electrical and electronic subjects in Ebonyi State technical colleges?

<table>
<thead>
<tr>
<th>S/N</th>
<th>ITEMS</th>
<th>XT</th>
<th>REMARKS</th>
<th>XS</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>47</td>
<td>Electronic Presentation Technology(Power Point)</td>
<td>3.61</td>
<td>Used</td>
<td>2.79</td>
<td>Not Used</td>
</tr>
<tr>
<td>48</td>
<td>Windows and File Management Technology</td>
<td>2.11</td>
<td>Not Used</td>
<td>3.12</td>
<td>Not Used</td>
</tr>
<tr>
<td>49</td>
<td>Computer Networking Technology</td>
<td>2.19</td>
<td>Not Used</td>
<td>3.02</td>
<td>Not Used</td>
</tr>
<tr>
<td>50</td>
<td>Internet and web Browsing Technology</td>
<td>3.59</td>
<td>Used</td>
<td>3.88</td>
<td>Used</td>
</tr>
<tr>
<td>51</td>
<td>Website Design and Navigation Technology</td>
<td>2.23</td>
<td>Not Used</td>
<td>2.48</td>
<td>Not Used</td>
</tr>
<tr>
<td>52</td>
<td>Electronic Spreadsheet Technology</td>
<td>2.28</td>
<td>Not Used</td>
<td>2.45</td>
<td>Not Used</td>
</tr>
<tr>
<td>53</td>
<td>Software Installation and Downloading Technology</td>
<td>1.96</td>
<td>Not Used</td>
<td>2.28</td>
<td>Not Used</td>
</tr>
<tr>
<td>54</td>
<td>Web communication technology</td>
<td>2.00</td>
<td>Not Used</td>
<td>3.08</td>
<td>Not Used</td>
</tr>
<tr>
<td>55</td>
<td>Computer Related Devices: DISCs, DVDs</td>
<td>3.15</td>
<td>Not Used</td>
<td>3.81</td>
<td>Not Used</td>
</tr>
<tr>
<td>56</td>
<td>USBs,CDs,etc</td>
<td>2.35</td>
<td>Not Used</td>
<td>2.76</td>
<td>Not Used</td>
</tr>
<tr>
<td>57</td>
<td>Video Conferencing Technology</td>
<td>2.68</td>
<td>Not Used</td>
<td>2.71</td>
<td>Not Used</td>
</tr>
<tr>
<td>58</td>
<td>Scanning Technology</td>
<td>2.94</td>
<td>Not Used</td>
<td>3.08</td>
<td>Not Used</td>
</tr>
<tr>
<td>59</td>
<td>E-mail and Database Management Technology</td>
<td>2.72</td>
<td>Not Used</td>
<td>3.77</td>
<td>Used</td>
</tr>
<tr>
<td>60</td>
<td>Word and Data Processing Technology</td>
<td>2.13</td>
<td>Not Used</td>
<td>2.97</td>
<td>Not Used</td>
</tr>
<tr>
<td>61</td>
<td>Computer Security Technology</td>
<td>2.05</td>
<td>Not Used</td>
<td>2.67</td>
<td>Not Used</td>
</tr>
<tr>
<td>62</td>
<td>Electronic Learning Technology</td>
<td>2.21</td>
<td>Not Used</td>
<td>2.96</td>
<td>Not Used</td>
</tr>
<tr>
<td>63</td>
<td>Audio Conferencing Technology</td>
<td>2.70</td>
<td>Not Used</td>
<td>3.37</td>
<td>Not Used</td>
</tr>
<tr>
<td>64</td>
<td>DVD Players, Audio Cassette Players</td>
<td>2.33</td>
<td>Not Used</td>
<td>3.33</td>
<td>Not Used</td>
</tr>
<tr>
<td>65</td>
<td>Projectors</td>
<td>2.01</td>
<td>Not Used</td>
<td>1.97</td>
<td>Not Used</td>
</tr>
</tbody>
</table>

The result of table 4 has revealed that ICT was poorly used for teaching and learning in Ebonyi State technical colleges. It indicated that only two out of the eighteen listed tools were used for teaching and learning in Ebonyi State technical colleges.

Table 5, illustrates one sample T-test for finding a significant difference between the responses of electrical and electronic students and that of their teachers on the utilization of ICT for teaching and learning.

### One-Sample Test

<table>
<thead>
<tr>
<th></th>
<th>t</th>
<th>df</th>
<th>Sig. (2-tailed)</th>
<th>Mean Difference</th>
<th>95% Confidence Interval of the Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Lower</td>
</tr>
<tr>
<td>TT</td>
<td>38.889</td>
<td>19</td>
<td>.000</td>
<td>2.77005</td>
<td>2.6277</td>
</tr>
<tr>
<td>TS</td>
<td>41.853</td>
<td>19</td>
<td>.000</td>
<td>3.35451</td>
<td>3.1943</td>
</tr>
</tbody>
</table>

Table 5 has indicated no significant difference between the mean responses of teachers and students on the utilization of ICT for teaching and learning of electrical and electronic subjects in Ebonyi State technical colleges. Therefore the null hypothesis was upheld. This confirms that ICT has not been fully utilized for teaching and learning of electrical and electronic subjects in Ebonyi state technical colleges.
Table 6, shows Analysis of variance of the responses of student from the four technical colleges on the usage of ICT for teaching and learning of electrical and electronic subjects in the technical colleges of Ebonyi state.

<table>
<thead>
<tr>
<th>Sources of Variance</th>
<th>Sum of Squares</th>
<th>Df</th>
<th>Mean Square</th>
<th>F-cal</th>
<th>F-tab</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>4.520</td>
<td>3</td>
<td>2.260</td>
<td>1.704</td>
<td>3.00</td>
<td>NS</td>
</tr>
<tr>
<td>Within Groups</td>
<td>274.603</td>
<td>207</td>
<td>1.327</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>279.124</td>
<td>210</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The analysis above indicated that there is no significant difference in the responses of the four technical colleges in Ebonyi State on the utilization of ICT for the teaching and learning of electrical and electronic subjects.

5. Findings from the Study
The utilization of ICT in technical colleges will have a positive impact on teaching and learning, especially electrical and electronic subjects. Despite the roles ICT can play in education, technical colleges in Ebonyi state are yet to espouse them for teaching and learning of electrical and electronic subjects. Therefore, gains of ICT in the technical colleges system have not been reaped in the state. Problems such as ignorance and lack of skills on the part of teachers, poor policy and project implementation strategies, and scarcity of infrastructure generally and ICT facilities in particular are responsible for this development. In order to ensure that ICT are widely adopted and used in Ebonyi State technical colleges system, the following recommendations should be adopted.

Discussions of Findings from the Study
From the result of the study, it has been found that though both teachers and students are familiar with some of the ICT tools, those they know are not used for teaching and learning. It was also found that some of these ICT tools are used by both teachers and students in leisure. It is true that students use ICT tools for leisure more than the teachers, but even the ones that are used by both are not utilized for teaching and learning of electrical and electronic subjects in the technical colleges of Ebonyi State. The non utilization can result from unavailability of such ICT tools in the technical colleges. Moreover, the study found out that younger teachers are more acquainted with ICT tools and used them more for leisure than their colleagues who are older in the field of teaching.

Recommendations
- Ebonyi state government should ensure that ICT policy statements are made and strictly followed.
- Decided efforts should be made to provide ICT facilities and every department of electrical and electronics of technical colleges in the state should be made beneficiaries of such ICT projects.
- Computer/ICT education should be made compulsory for all technical colleges students. At present, the National Policy on Education, 4th ed., has made computer education an elective course in high schools. This means only those who elect to take it will have computer education in high school.
- Efforts should be made by Ebonyi State Secondary Education Board in ensuring that teachers who are skilled in ICT are posted to each technical colleges to impart ICT skills to the students of electrical and electronics.
- Henceforth, skills in ICT should be a prerequisite for employing teachers of electrical and electronic subjects in technical colleges of Ebonyi State and provisions should be made to train those who are already in the service in ICT skills.
- A regular ICT update program should be initiated and sustained for electrical and electronic subject teachers by the state secondary education board.

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