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# ICT Literacy Skills, Accessibility and use of Web-Based Information Resources by Public Polytechnic Students

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## Abstract

Web-based Information Resources (WBIR) are becoming increasingly important tools for students to use in order to complete academic tasks. Existing research has focused on students' use of online and offline e-resources, with little attention paid to the use of WBIR. This study, therefore, was carried out to investigate ICT Literacy Skills (ICTLS), accessibility to and use of WBIR by public polytechnic students in Southwestern Nigeria. Six public polytechnics (Federal Polytechnic, Ado-Ekiti, Federal Polytechnic, Ede, Federal Polytechnic, Ilaro, Lagos State Polytechnic, Rufus Giwa Polytechnic, and The Polytechnic, Ibadan) out of the 16 offering Higher National Diploma (HND) programmemes were selected by equal allocation sampling method to reflect federal and stage polytechnics. Proportionate to size of 10% was used to select 1,463 out of 14,629 HND students. The instruments used were ICTL Skills (α=0.93), Accessibility to WBIR (α=0.79), and WBIR use (α=0.98) scales. Data were analysed using descriptive statistics, and Pearson's product moment correlation at 0.05 level of significance. Students' ICTL skills was high against 47-68 test norm. Accessibility to WBIR was average. Online reference sources, Web 2.0, and social media were regularly used WBIR. The level of WBIR use was moderate against the test norm of 21-35. The Students' ICTL skills r=0.39**, p = .000., accessibility to WBIR r=0.59**, p = .000. had significant relationships with WBIR use. ICT literacy and accessibility are directly related to the use of web-based information resources. Polytechnic administration should provide more ICT infrastructure for students to use in polytechnic e-libraries.

**Keywords**: Accessibility to Web-Based Information Resources, ICT Literacy Skills, Public Polytechnic Students, Polytechnic Libraries

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## Introduction

The British educational system, which colonial administrators instituted in Nigeria, tended to produce semi-literate people who could perform some administrative jobs for the colonial authority while ignoring vocational and technical education. Nigeria's leadership realised that if it continues to rely on imported technologists and foreign education, the country may not be self-sufficient in the future. As a result, Nwalo (1997) asserts that purposeful attempts to nurture indigenous peoples are necessary. Therefore, deliberate efforts to generate indigenous manpower at the middle level drove successive federal, regional, and state administrations to create a type of education and training capable of producing indigenous technicians from vocational and technical schools.

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The National Board for Technical Education (1984), and NBTE (1979) set the goals of polytechnics and colleges of technology in Nigeria. Polytechnics and colleges of technology, according to Nwalo (1997), have the following goals: to provide full-time and part-time courses and training in Technology, Natural and Applied Sciences, Commerce, Managerial Sciences, Agricultural Production and Distribution; and allow adequate opportunities for technology and applied science research and development so that existing technology can be enhanced or new concepts can be developed; Produce commodities and services so that the country can rely on technology for its survival.

Polytechnic students are, therefore, enrolled in a two-year National Diploma (ND) programme, followed by a two-year Higher National Diploma (HND) programme, in order to obtain certification in various disciplines of human development and training. Hence, students pursuing a Higher National Diploma (HND) at authorised federal and state government owned polytechnics in two states in Southwestern Nigeria were included in the study. This is due to the fact that HND students are required to have a high level of exposure and knowledge of important information resources available on numerous websites in order to complete their academic tasks compared to ND students who perhaps are just starting their educational career.

The distribution of web-based information resources is in great demand to meet the information needs of academic communities (lecturer, students and researchers) of monotechnics, colleges, polytechnics, or universities. Thanks to introduction of new technologies in library and information science as a field of human knowledge (Brar, 2016). Perhaps this is why Patel (2015) claims that the work of librarians and information professionals has changed drastically in a web-based environment. Thus, their mission is to train students on how to use current resources by regularly organising workshops, book talks, and debates, as well as developing web-based content and providing web-based information resources and service to their clients.

According to Brar (2016), the use of information resources available through websites nowadays marks a shift from print to electronic information resources such as e-databases, e-books, e-journals, and more information subject gateways. Students are supposed to benefit from these materials, which are regularly used by them, in order to conduct more effective research and complete higher-quality academic tasks. In other words, Polytechnic students nowadays use web-based information resources as an instructional medium to blend informal learning into formal learning environments within the various academic disciplines being churned out (Chen and Bryer, 2012; Rainie and Wellman, 2012; Patel, 2015; Brar, 2016; Yemi-Peters, Abdulrahman, Oladokun and Ufedo, 2022).

Based on increasingly existence of the explosion of information, instructors are increasingly teaching students how to think carefully about what they want to find on the Internet and which key words would be most useful before heading to a computer system. Thus, ICT is defined as a collection of networks, hardware, and software, as well as communication, collaboration, and engagement tools, that allow for the processing, management, and exchange of data, information, ideas, and knowledge. To put it in a different way, ICT involves the usage of mobile phones, smart phones, Personal Computers (PCs), the Internet, all of which have been important tools in catalysing the most drastic developments in the modern information environment. These technologies are quick, interactive, and multimodal, giving students the ability to choose how and when they learn (Shishehgar, Dolatian, Majd and Bakhtiary, 2014; Yilmaz and Yilmaz, 2022). To effectively utilise web-based information resources for their academic tasks, polytechnic students are expected to be highly proficient in terms of technical and Internet searching competences and skills.

The prevalence of undesired information on websites poses a serious hazard because students spend the majority of their learning time on websites that include unwelcome content, such as pornographic materials, when searching the Internet (Devadason, 2010). Yet, many students may not be proficient in the procedure of information access and use: that web browser should be launched first, and databases accessed via the web browser, then evaluate the information before retrieval. In a traditional environment, the quality of documents containing information can be adjudicated using standard criteria like scope, authority, arrangement, treatment, and special characteristics (Soysal, Coşkun and Alma, 2017; Engelhardt, Naumann, Goldhammer, Frey, Horz, Hartig and Wenzel, 2021). The criteria can equally be embraced to authenticate the worth of information materials obtainable from the web. To ensure effective use of web-based information resources for academic

tasks, polytechnic students need a very high level of ICT literacy skills. Thus, library and information professionals need to incorporate in their campaign for information literacy skills, the need to develop the ICT literacy skills of the polytechnic students who in turn register as library users.

ICTs have substantially increased and broadened the influence and skillfulness of its users in terms of electronic information searching (Olatoye, Nekhwevha and Muchaonyerwa, 2021). Emwanta and Nwalo (2013) advocated for the learning of the appropriate skills needed to maximize ICT potentials based on this concept. Competence in computer procedures is one of these talents. According to Njoroge (2019), ICT skills include abilities such as evaluating, recognizing, and effectively utilizing given information. As a result, ICT literacy skills should be acquired. Olatoye (2019) stated that computer proficiency is not the sole ICT skill necessary in the exploitation of information posted on the Internet. It is necessary to be ICT literate in order to take benefit of Internet materials.

Internet abilities are becoming increasingly important as technology becomes more prominent on a daily basis. For example, using search engines to locate and retrieve information necessitates a higher level of Internet evaluation expertise (United Nations Economic and Scientific Cultural Organisation, 2018). Meanwhile, evaluating and synthesising data from a number of web-based information resources necessitates even more complex Internet searching abilities. This is a degree of literacy that goes much beyond what is required in a more constrained situation, such as textbooks, which provide all information in one place. This is due to the fact that the nature of online content differs and fluctuates depending on how ICTs are used (International Telecommunications Union, 2016).

ICT literacy skills also include the capacity to send information and receive messages using ICT devices, upload and download computer files easily, print files from computers, generate files, format files, copy and move files and documents, and turn off and on computer devices, among other things. Polytechnic students who have a strong grasp of the technical aspects of ICT devices are more likely to gain access to information resources across different websites from a diversity of locations using a variety of ICT devices, allowing them to keep their ICT literacy skills up to date (International ICT Literacy Panel, 2007).

When students are made aware of available web-based information resources, it is anticipated that those resources be well-organised, flexible, and accessible from a variety of locations other than the library. In terms of accessibility, the literature reviewed showed that, in comparison to previous generations, younger generations are more favourable about using web-based information resources on their personal computers, laptop, mobile phones, tablets, and iPhones. In other words, polytechnic students' access to web-based information resources could be improved by using personal computers, laptops, mobile phones, tablets, and iPhones. Some web-based resources, on the other hand, require a password and a user ID to access, while others are unrestricted. While certain web-based information resources are accessible via any ICT device, others are exclusive to computer systems (International Telecommunications Union, 2016; Yilmaz and Yilmaz, 2022).

As notices in the digital age, proper access to ICT gadgets like laptops, desktop computers, smartphones, netbooks, and other similar devices at various locations such as public cyber cafés drive accessibility to web-based information resources (OpenNet Initiative, 2010). Meanwhile, following the submission of the OpenNet Initiative, accessibility could be a function of knowing where to go when in need of items of information resources that are domiciled on websites for academic tasks, such as stays in a personal residence, polytechnic ICT centers, e-library, friends and relatives' residence, and so on.In a similar vein, the desire to search using the deep web, such as institutional-based online-databases that are purely subscription-based, or the usage of a traditional web search through search engines like Google, could improve accessibility.

Access to web-based information resources is critical for polytechnic students to learn and use new skills that may be relevant to their academic tasks in today's changing and dynamic environment. Not only does access to web-based information resources entail particular physical, social, and legal prerequisites, but the information must also be turned into knowledge in order to be valuable for academic tasks (Garrido and Wyber, 2019). High unemployment rates among polytechnic students may be due to several impediments to education and training opportunities. Students' increased access to web-based information resources may thus contribute to the development of employable skills

and overall employability (European Commission, 2016; International Telecommunication Union, 2016; Garrido and Wyber, 2017; Yeşilyurt and Vezne, 2023).

Access to web-based information resources and knowledge is critical for the growth of a creative economy, and most countries are currently implementing measures to improve students' ICT literacy skills at all levels of education in order to be more relevant in the global economy (World Bank, 2018; Buba, Song and Abdullahi, 2021). ICT literacy capabilities enable learners to access web-based information resources and knowledge almost instantly from anywhere on the planet. A few examples include expanding the information base, lowering the cost of information and search, and manufacturing information commodities. In a nutshell, ICT literacy skills can help students with relevant academic activities by simplifying information searching, matching, and sharing (World Bank, 2016; Garrido and Wyber, 2017).

Access to the usage of web-based information resources by polytechnic students is a crucial engine for quality academic activities that contribute to national economic growth. Meanwhile,both young and older polytechnic students may find it difficult to develop ICT literacy skills. The literature reviewed demonstrates that the prime generation of students when compared to younger students, those in the Information Age may make the least use of information-processing abilities, particularly ICT skills. A survey by the Organization for Economic Cooperation and Development assesses people's ability to evaluate information from a variety of sources, assessing the credibility and utility of what is written using self-established standards, and to work out tasks that require the reader to find information in a different context, in the face of uncertainty, and without explicit directions (Partnership for 21st Century Learning, 2015).

The twenty-first century's information-driven society is made up of a community of people who are hungry for knowledge. Information and communication technologies (ICTs), often known as information technologies, play a critical role in social and economic situations. Any segment, business, or individual who is not on board with these information technologies is typically characterized as "backward." The Internet has facilitated the world's development into a global community (Cantoni, Jereissati, and Lins, 2019).For optimal operation in the global community, access to ICT devices such as computers, netbooks, notebooks, palmtops, mobile phones, iPhones, and other similar devices at home, public cyber cafés, libraries, and other venues is vital. Therefore, access to web-based information resources can be viewed as a complex process involving people's abilities to use, develop, and distribute knowledge in ways that are relevant, accepted, and valued by academic institutions such as polytechnics (Garrido and Wyber, 2017).

Students must be able to use web-based information resources effectively in order to create and participate in dynamic economic systems, where knowledge production and application leads to creativity, innovation, and entrepreneurship, promoting the emergence of dynamic education systems and national economic growth (ITU, 2016). ICT enhances academic activities by easing access to and use of web-based information resources for the creation and free dissemination of new knowledge. Meanwhile, open web-based information resource environments are ones in which information access and usages are not restricted, but are more conducive to the creation of new knowledge and innovation (Cantoni, Jereissati, and Lins, 2019).

E-journals, electronic databases (such as full-text databases, indexing and abstracting databases, numeric and statistical databases, and reference databases), e-biographies, online dictionaries, online directories, and online encyclopaedias; e-books; e-images; and e-audio and visual resources are all examples of web-based information resources (Akuffo and Budu, 2019; Yemi-Peters, Abdulrahman, Oladokun and Ufedo 2022). Students can use electronic devices such as desktop computers, laptops, iPads, tablets, and/or mobile phones to access web-based information resources for a variety of academic purposes or from a variety of locations to access web-based information resources for a variety of academic purposes or from a variety of locations (Rassiya and Chinnasamy 2014; Buba, Abubakar and Yahaya, 2019; Yeşilyurt and Vezne, 2023).

In this study, the speed at which information outputs of varying kinds and formats are produced from various locations using various ICT devices is determined by accessibility to web-based information bearing resources. In addition, web-based information bearing resources have the potential to improve student learning by revealing large amounts of knowledge in a non-sequential style that is easily accessible. In other words, web-based resources give users access to knowledge that is valuable for a variety of academic

tasks but could be otherwise unavailable to them due to their physical location or financial constraints. Furthermore, web-based resources enable access to up-to-date information because they are updated on a frequent basis (Emwanta and Nwalo, 2013).

Meanwhile, Soysal, Coşkun and Alma (2017) submit that the more adept polytechnic students are when it comes to use of ICT tools, the better accessibility they would have to different web-based information resources and employ the same for their academic tasks. In other words, the more students have accessibility to various ICT devices like personal computer systems, laptops, mobile and smart phones, iPhones and tablets at home, cyber cafés, friends and colleague apartments, the polytechnic e-library center, and so on, the better they will be able to use various types of web-based information resources for different academic activities, and their ICT literacy skill will improve. From the literature reviewed, many studies have been conducted on use of electronic information resources by undergraduate students in Nigerian universities, not even in polytechnics. Yet, there is still a gap as it appears no study has been conducted on use of information resources that are domiciled on the web (web-based information resources) by polytechnic students. The study, therefore, investigates ICT Literacy Skills, Accessibility and use of Web-based Information resources by public polytechnic students in Southwestern Nigeria.

## 2. Statement of the problem

Academic tasks are information-intensive, necessitating the use of institutional libraries, which must provide information to support excellent teaching, learning, and research activities through subscriptions to both print and electronic information resources. Meanwhile, the nature, value, and accessibility to information have changed dramatically since the turn of the twenty-first century, impacting how each individual student lives, learns, and performs the various academic tasks. According to the literature reviewed, polytechnic libraries are underfunded, which affects subscriptions to both print and electronic information resources. As a result, students make private arrangements to obtain information from the Internet. Similarly, many students frequently complain that the quantity of information on websites makes it difficult to access and use the precise information needed to meet a need. This could be attributed to the students' general lack of ICT literacy. Therefore, the study investigates ICT Literacy Skills, Accessibility and use of Web-based Information resources by public polytechnic students in Southwestern Nigeria.

## 3. Objectives of the study

The main objective of the study is to investigate ICT Literacy Skills, Accessibility and use of Web-based Information resources by public polytechnic students in Southwestern Nigeria. However, the specific objectives are to:

- Ascertain the level of ICT literacy skills of public polytechnic students in Southwestern Nigeria.
- Determine the extent of accessibility to web-based information resources by public polytechnic students in Southwestern Nigeria.
- Determine the extent of use of web-based information resources by public polytechnic students in Southwestern Nigeria.
- Affirm the relationships between ICT literacy skills and use of web-based information resources by public polytechnic students in Southwestern Nigeria.
- Establish the relationships between accessibility to and use of web-based information resources by public polytechnic students in Southwestern Nigeria.

## 4. Hypotheses

The following null hypotheses were tested in the study at 0.05 level of significance:

**Ho1:** There is no significant relationship between ICT literacy skills and use of web-based information resources by public polytechnic students in Southwestern Nigeria.

**Ho2:** There is no significant relationship between accessibility to and use of web-based information resources by public polytechnic students in Southwestern Nigeria.

## 5. Methodology

The descriptive-correlational research design was used in the study. In order to ensure that at least, one polytechnic is selected from each of the six selected is selected from each of the six states in

Southwestern Nigeria, equal allocation method was used to select three federal polytechnics randomly from three different states out of four that offer HND programmemes in Southwestern Nigeria, and three state polytechnics from the remaining three states in Southwestern Nigeria were equally selected. Therefore, six (6) polytechnics out of the sixteen (16) accredited polytechnics offering HND programmemes in Southwestern Nigeria were selected. The federal polytechnics that were involved in the study are Federal Polytechnic, Ede, Osun State, Federal Polytechnic, Ilaro, Ogun State and Federal Polytechnic, Ado-Ekiti, Ekiti State while the state polytechnics that were studied include Lagos State Polytechnic, Ikorodu, Lagos, The Polytechnic Ibadan, Oyo State, and Rufus Giwa Polytechnic, Owo, Ondo State. The population figures obtained from the six selected polytechnics' registries as at the 2021/2022 academic session is fourteen thousand, six hundred twenty-nine (14,629). Thereafter, proportionate to size sampling technique was used to select 10% of 14,629 HND students across the selected six polytechnics, giving 1,463 sample size. The 10% sampling fraction offered the opportunity to select a large number of respondents who would be a true representation of the entire population of the entire population in all polytechnics being studied. This is in line with Guthrie (2010) who submits that instead of taking a simple random sample of the whole population figure that is already known, 10% is recommended to be randomly selected within each category once the population is in hundreds or thousands which is large enough and the sample thereafter, is representative.

A self-developed questionnaire based on the literature reviewed, titled "ICTLS, Accessibility and WBIR use Questionnaire" was used as the instrument for data collection. In order to determine the reliability of the research instrument, the draft of the questionnaire were pre-tested on thirty (30) students of Ibadan City Polytechnic that was outside the study locations. The instruments yielded reliability coefficient for ICTL Skills (α=0.93), Accessibility to WBIR (α=0.79), and WBIR use (α=0.98) scales. Hence, Nunnally and Bernstein (1994) classification of scores for interpreting mean obtained from a 5-point Likert scale such as: 1.00 – 2.00 depicts low level, 2.01 – 3.00 average, 3.01 – 4.00 high average, and 4.01 – 5.00 signifies high level is hereby adopted for accessibility scale. Similarly, the mean scores for ICT Literacy and WBIR use scales are to be interpreted based on the values obtained from 4-points Likert scales. Therefore, the mean scores and weighted average obtained as 1.00 – 2.00 depicts low level, 2.01 – 3.00 average or moderate level, while 3.01 – 4.00 signifies high level.

A total of one thousand, four hundred and sixty-two (1,462) copies of questionnaire that was used for data collection were administered. However, one thousand, three hundred and eighty-seven (1,387) copies were promptly completed and returned, resulting in a 94.9% response rate. Descriptive statistics methods such as frequency count, mean, and standard deviation were utilised to characterize demographic parameters and achieve the objectives 1–3, while a test of non-parametric (Spearman rho) was used to test the null hypotheses 1 and 2. Data collected for this study was coded and analyzed using Statistical Package for Social Sciences (SPSS V. 25).

## 6. Results and Discussion

### Demographic characteristics of respondents

Figure 1 is a pie chart that shows the respondents' level of study, Figure 2 shows the respondents' age range, while Figure 3 presents the response rate on the gender of the respondents

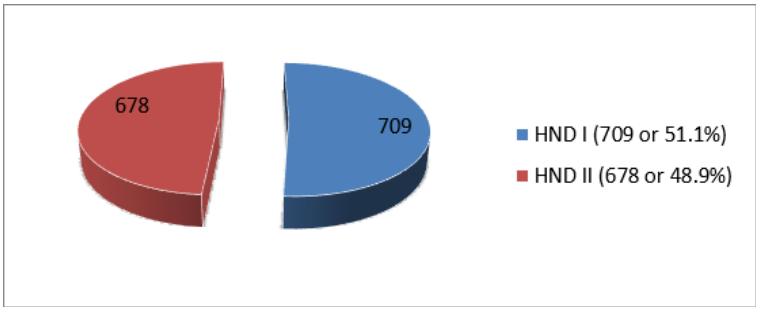



**Figure 1:** Respondents' level of study

Majority of the respondents (709 or 51.1%) were HND I students while 678 (48.9%) were HND II students (Fig. 1).

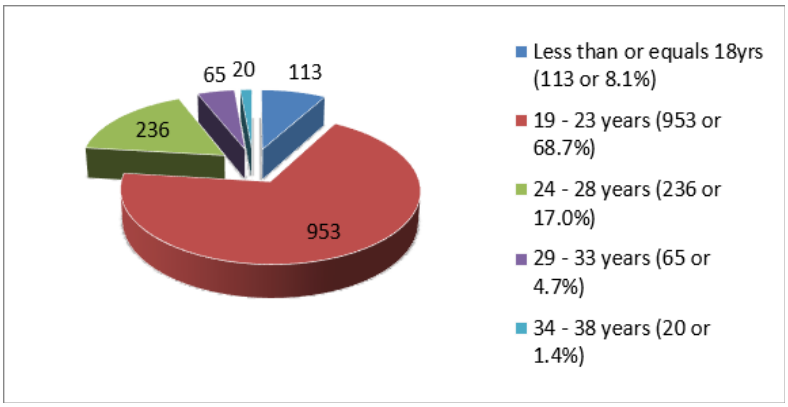



**Figure 2:** Age of the respondents

Results in Figure 2 shows that (953or 68.7%) were between ages 19 - 23 years, 236(17.0%) were between ages 24 - 28 years while 113(8.1%) were between ages less than or equals 18 years. This suggests that majority of the respondents were still in their active years of post-secondary school level of education since they were under ages 30 years as recognised by the Nigerian Youth Service Corps (NYSC) scheme.

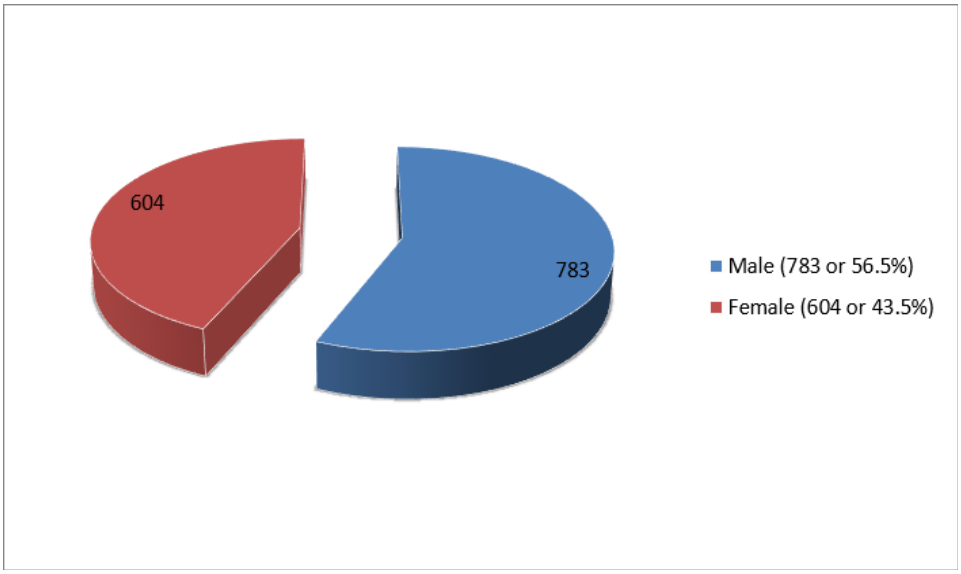



**Figure 3:** Gender of the respondents

Majority of the respondents (783 or 56.5%) were male while 604 (43.5%) were females (Fig. 3). Male students were more than females perhaps, due to the technical nature of polytechnic education which many people in contemporary Nigeria see as masculine type. However, it seems females nowadays are equally embracing polytechnic education on a daily basis.

**Level of ICT literacy skills of public polytechnic students in Southwestern Nigeria**

**Table 1:** ICT literacy skills of public polytechnic students in Southwestern Nigeria

| S/N | Technical skills | 1 = I don't know what this means (%). | 2 = I know what this means but I cannot do it (%). | 3 = I can do this with help from someone (%). | 4 = I can do this very well by myself (%). | Mean ($\bar{x}$) | Std. Dev. |
|---|---|---|---|---|---|---|---|
| 1. | Good word processing skills: able to write acceptable search terms in the search bar of various search engines. | 142 (10.2) | 31 (2.2) | 423 (30.5) | 791 (57.0) | 3.34 | .941 |
| 2. | Installation of operating systems, web apps, and other software on computer(s) / smart devices so that I can use web-based information resources for my academic tasks. | 113 (8.1) | 148 (10.7) | 579 (41.7) | 547 (39.4) | 3.12 | .901 |
| 3. | Multimedia text and presentations are packaged by incorporating images, graphs, audio, and video from websites into the text. | 280 (20.2) | 123 (8.9) | 189 (13.6) | 795 (57.3) | 3.08 | .210 |
| 4. | Start, log on, and turn off ICT devices, such as a computer system. | 76 (5.5) | 59 (4.3) | 53 (3.8) | 1199 (86.4) | 3.71 | .787 |
| 6. | Word processing, spreadsheet applications, and graphical presentation are all skills that you should have. | 118 (8.5) | 67 (4.8) | 339 (24.4) | 863 (62.2) | 3.40 | .921 |
| 7. | Make a folder and various types of files, then save them to the desired location. | 122 (8.8) | 34 (2.5) | 432 (31.1) | 799 (57.6) | 3.38 | .901 |
| 8. | Using a word processor, write for various academic tasks using information obtained from the internet. | 122 (8.8) | 216 (15.6) | 349 (25.2) | 700 (50.5) | 3.17 | .991 |
| 9. | I may highlight, copy, and paste text in a document or another location once I've accessed web-based information. | 124 (8.9) | 85 (6.1) | 252 (18.2) | 926 (66.8) | 3.43 | .951 |
| 10. | Quality, dependability, relevancy, objectivity, and utility of information found on the internet are all evaluated. | 182 (13.1) | 86 (6.2) | 310 (22.4) | 809 (58.3) | 3.26 | .051 |
| 11. | Edit hypertext / Internet links and images in text and other online material. | 114 (8.2) | 103 (7.4) | 615 (44.3) | 555 (40.0) | 3.16 | .882 |
| | Internet search skills | 1 = I don't know what this means (%). | 2 = I know what this means but I cannot do it (%). | 3 = I can do this with help from someone (%). | 4 = I can do this very well by myself (%). | Mean ($\bar{x}$) | Std. Dev. |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 12. | To acquire access to web-based information sources, visit various websites on the Internet. | 92 (6.6) | 98 (7.1) | 279 (20.1) | 918 (66.2) | 3.46 | .888 |
| 13. | For access to web-based information resources, use search engines such as Google. | 106 (7.6) | 32 (2.3) | 368 (26.5) | 881 (63.5) | 3.46 | .868 |
| 14. | Use the Internet to download files, photos, and movies. | 71 (5.1) | 90 (6.5) | 116 (8.4) | 1110 (80.0) | 3.63 | .818 |
| 15. | Files, photos, and videos can be uploaded to the Internet. | 177 (12.8) | 92 (6.6) | 368 (26.5) | 750 (54.1) | 3.22 | .035 |
| 16. | To keep material for later use, use cloud storage services such as Dropbox, SkyDrive, and Google Drive. | 279 (20.1) | 118 (8.5) | 356 (25.7) | 634 (45.7) | 2.97 | .161 |
| 17. | Use social media to find information that could help you with your academic tasks (Facebook, Twitter, Messenger, etc.). | 144 (10.4) | 28 (2.0) | 156 (11.2) | 1059 (76.4) | 3.54 | .955 |
| **n = 1,387; Overall mean ($\bar{x}$) = 53.34; Weighted mean ($\bar{x}$) = 3.14; Std. = 10.048** | | | | | | | |

Results in Table 1 show that (1,199 or 86.4%) of the respondents can personally start, log on, and turn off ICT devices, such as a computer system ($\bar{x}$ = 3.71; Std. = .79). Once accessed web-based information, 926 (66.8%) can personally highlight, copy, and paste text in a document or the desired location ($\bar{x}$ = 3.43; Std. = .95). In the same vein, 791 (57.0%) have good command in word processing, spreadsheet software, and graphics presentation ($\bar{x}$ = 3.40; Std. = .92). Meanwhile, 579 (41.7%) affirmed that they can perform installation of Operating System (OS), web applications, and other software in computer(s)/smart devices in order to make use of web-based information resources for their academic tasks with help from someone ($\bar{x}$ = 3.12; Std. = .90). Table 1 further reveals that 1,110 (80.0%) respondents can download files, images, and videos from the Internet personally ( $\bar{x}$ = 3.63; Std. = .82). Similarly, 1,059 (76.4%) respondents affirmed that they can personally use social media to access information useful for academic tasks (Facebook, Twitter, Messenger, and so on) with precise $\bar{x}$ = 3.54. In addition, 881 (63.5%) respondents indicated that they can use search engines such as Google search for access to web-based information resources personally ( $\bar{x}$ = 3.46; Std. = .89).

According to the findings in Table 1, the majority of respondents are very proficient in technical ICT skills, as they can start, log on, and shut down ICT devices such as computers; select, copy, and paste text in a document or the desired location; use word processing, spreadsheet software, and graphics presentations; and create folders and various types of files. In a similar vein, the majority of respondents have some basic Internet skills, such as downloading files, photos, and videos, as well as using social media to obtain material relevant to academic tasks.

To gain access to web-based information resources, search engines such as Google are used. Among other things, files, photos, and movies are uploaded to the Internet. These ICT literacy skills possessed by polytechnic students are critical for the use of web-based information resources, particularly in polytechnic libraries where subscriptions to web-based information resources domiciled on accredited databases for academic instructional materials are made.

A norm test was conducted to measure the level of ICT literacy skills of polytechnic students in Southwestern Nigeria. Since there are seventeen items used to determine the level of ICT Literacy skills on 4-points Likert scale, the norm test reveals the expected summation of mean scores to be 68. Hence, having divided the 68 n to three on the basis of either low level, or moderate level or high level, the scale between 1 - 23 is low, 24 - 46 is intermediate, and 47 - 68 is high. However, because the total mean ($\bar{x}$) score for ICT literacy skills is "53.34," which falls within the range of "47 – 68," weighted mean ($\bar{x}$ = 3.14), and Std. = 10.05, it may be stated that students in public polytechnics in southern Nigeria have very good high

level of ICT literacy skills. This corroborates Hossain (2017) who conducted a study on the 'ICT literacy of Information Science and Library Management students in Bangladesh,' and discovered that students have high skills in basic computer operating (technical skills), such as the ability to properly startup, log on, and shut down a computer, as well as the use of word processing software, graphics presentation (for example, using Microsoft PowerPoint), and other software (for example, micro soft excel). In 2017, Hossain added that it's worth noting that students are equally adept at using database software (such as MS-Access) as they are at using notebook software (for example, MS Onenote, Evernote).

**Extent of accessibility to web-based information resources by public polytechnic students in Southwestern Nigeria**

**Table 2: Accessibility to web-based information resources by the public polytechnic students**

| S/N | Web-based information resources | 1 = Very Low(%) | 2 = Low(%) | 3 = Moderate (%) | 4 = High(%) | 5 = Very High(%) | Mean ($\bar{x}$) | Std. Dev. |
|---|---|---|---|---|---|---|---|---|
| 1. | Electronic journals | 521 (37.6) | 413 (29.8) | 250 (18.0) | 91 (6.6) | 112 (8.1) | 2.18 | .231 |
| 2. | Online reference sources e.g. dictionaries, encyclopaedia | 178 (12.8) | 55 (4.0) | 184 (13.3) | 182 (13.1) | 788 (56.8) | 3.97 | .420 |
| 3. | Online books | 177 (12.8) | 236 (17.0) | 292 (21.1) | 330 (23.8) | 352 (25.4) | 3.32 | .354 |
| 4. | Online theses / dissertations | 255 (18.4) | 386 (27.8) | 459 (33.1) | 181 (13.0) | 106 (7.6) | 2.64 | .149 |
| 5. | Catalogue software e.g. OPAC | 323 (23.3) | 334 (24.1) | 519 (37.4) | 129 (9.3) | 82 (5.9) | 2.50 | .121 |
| 6. | Online indexes and abstracts | 192 (13.8) | 281 (20.3) | 618 (44.6) | 177 (12.8) | 119 (8.6) | 2.82 | .093 |
| 7. | Online newspapers / magazines | 160 (11.5) | 112 (8.1) | 491 (35.4) | 216 (15.6) | 408 (29.4) | 3.43 | .299 |
| 8. | E-proceedings online | 281 (20.3) | 287 (20.7) | 354 (25.5) | 286 (20.6) | 179 (12.9) | 2.85 | .311 |
| 9. | Social media platform e.g. academia | 471 (34.0) | 8 (0.6) | 351 (25.3) | 199 (14.3) | 358 (25.8) | 2.97 | .594 |
| 10. | Web 2.0 e.g. blog, wiki | 222 (16.0) | 126 (9.1) | 384 (27.7) | 461 (33.2) | 194 (14.0) | 3.20 | .258 |
| **n = 1,387; Overall mean ($\bar{x}$) = 29.89; Weighted mean ($\bar{x}$) = 2.99; Std. = 7.386** | | | | | | | | |

Table 2 shows that the majority of respondents (788 or 56.8%) said they relied heavily on online reference sources such as dictionaries and encyclopedias. Similarly, 461 (33.2%) responded that they highly used Web 2.0 technologies, particularly blogs and wikis. Meanwhile, 618 (44.6%) reported using online indexes and abstracts on a moderate basis. Similarly, 459 (33.1%) confirmed using online theses/dissertations moderately. The weighted mean for accessibility yielded ($\bar{x}$=2.99), with Std. = 7.39 which falls within the mean score criterion of 2.01 – 3.00. Therefore, it could be concluded that there is accessibility to web-based information resources to an average extent by public polytechnic students in Southwestern Nigeria. This affirms Akuffo and Budu (2019) who submitted that to a moderate

extent, students in tertiary institutions have access to e-biographies, online dictionaries, online directories, and online encyclopaedias, e-books, e-images, and e-audio and visual resources.

**Extent of use of web-based information resources for academic tasks by public polytechnic students in Southwestern Nigeria**

**Table 3: Types of web-based information resources used by the public polytechnic students**

| S/N | Web-based information resources | 1 = Never Used (%) | 2 = Rarely Used (%) | 3 = Occasionally Used (%) | 4 = Often Used (%) | 5 = Very Often Used (%) | Mean ($\bar{x}$) | Std. Dev. |
|---|---|---|---|---|---|---|---|---|
| 1. | Electronic journals | 387 (27.9) | 297 (21.4) | 98 (7.1) | 281 (20.3) | 324 (23.4) | 2.90 | .568 |
| 2. | Online reference sources e.g. dictionaries, encyclopaedia | 212 (15.3) | 29 (2.1) | 100 (7.2) | 300 (21.6) | 746 (53.8) | 3.97 | .439 |
| 3. | Online books | 204 (14.7) | 121 (8.7) | 514 (37.1) | 183 (13.2) | 365 (26.3) | 3.28 | .336 |
| 4. | Online theSeS / dissertations | 385 (27.8) | 160 (11.5) | 573 (41.3) | 178 (12.8) | 91 (6.6) | 2.59 | .204 |
| 5. | Catalogue software e.g. OPAC | 424 (30.6) | 283 (20.4) | 406 (29.3) | 190 (13.7) | 84 (6.1) | 2.44 | .223 |
| 6. | Online indexes and abstracts | 473 (34.1) | 206 (14.9) | 287 (20.7) | 348 (25.1) | 73 (5.3) | 2.53 | .323 |
| 7. | Online newspapers / magazines | 254 (18.3) | 437 (31.5) | 133 (9.6) | 317 (22.9) | 246 (17.7) | 2.90 | .406 |
| 8. | E-proceedings online | 423 (30.5) | 235 (16.9) | 209 (15.1) | 383 (27.6) | 137 (9.9) | 2.69 | .403 |
| 9. | Social media platform e.g. academia | 258 (18.6) | 351 (25.3) | 251 (18.1) | 185 (13.3) | 342 (24.7) | 3.00 | .455 |
| 10. | Web 2.0 e.g. blog, wiki | 206 (14.9) | 161 (11.6) | 126 (9.1) | 523 (37.7) | 371 (26.7) | 3.50 | .382 |
| **n = 1,387; Overall mean ($\bar{x}$) = 29.79; Weighted mean ($\bar{x}$) = 2.98; Std. = 8.647** | | | | | | | | |

Table 3 shows that 746 (or 53.8%) of respondents used online reference sources such as dictionaries and encyclopaedias frequently ( $\bar{x}$ = 3.97; Std. = .44). Similarly, 523 (37.7%) of respondents frequently use Web 2.0 tools such as blogs and wikis ( $\bar{x}$ = 3.50; Std. = .38). Similarly, 342 (24.7%) respondents said they used social media platforms, such as academia, frequently ( $\bar{x}$ = 3.00; Std. = .46). Furthermore, 514 (37.1%) of respondents stated that they occasionally use Online books. On use of web-based information resources, the weighted mean ($\bar{x}$ =2.98), with Std. = 8.65 falls within the mean score criterion of 2.01 – 3.00. Thus, it can be deduced that the main types of web-based information resources used by public polytechnic students to an average extent are: online reference sources such as dictionaries and encyclopedias, Web 2.0 such as blogs and wikis, online books, social media platforms such as academia, online newspapers/magazines, online proceedings, and online indexes and abstracts. The findings back up Ankrah and Acheampong (2017), who discovered that the level at which virtually all students in tertiary educational institutions currently use web-based information resources for research and other academic tasks on a regular basis is very high.

**Testing the hypotheses**

The null hypotheses formulated for this study were tested at 0.05 level of significance.

HO1: There is no significant relationship between ICT literacy skills and use of web-based information resources by public polytechnic students in Southwestern Nigeria.

**Table 4: Relationship between ICT literacy skills and use of web-based information resources**

| Variables | Mean (x̄) | Std. Dev. | N | rho | df | Sig. (p) |
|---|---|---|---|---|---|---|
| ICT Literacy Skills | 53.34 | 10.048 | 1,387 | | | |
| | | | | .389** | 1,385 | .000 |
| Use of web-based information resources | 29.79 | 8.647 | 1,387 | | | |

*. Significant at 0.05 level

**Decision Rule:**

Table 4 shows the relationship between ICT literacy skills and web-based information resource use among public polytechnic students in Southwestern Nigeria. The test results show that there is a significant positive relationship between ICT literacy skills and web-based information resource use by public polytechnic students in Southwestern Nigeria, r = .39**, p = .000. Hence, the null hypothesis 1 is rejected. The findings support the arguments of Emwanta and Nwalo (2013) and Abubakar and Adetimirin (2015) that ICTL skills can be a useful tool in supporting students in utilising appropriate web-based information resources.

Ho2: There is no significant relationship between accessibility to and use of web-based information resources by public polytechnic students in Southwestern Nigeria.

**Table 5: Relationship between accessibility to and use of web-based information resources**

| Variables | Mean (x̄) | Std. Dev. | N | rho | df | Sig. (p) |
|---|---|---|---|---|---|---|
| Accessibility to web-based information resources | 29.89 | 7.386 | 1387 | | | |
| | | | | .594** | 1,385 | .000 |
| Use of web-based information resources | 29.79 | 8.647 | 1387 | | | |

*. Significant at 0.05 level

**Decision Rule:**

Table 5 shows the relationship between public polytechnic students in Southwestern Nigeria's access to and use of web-based information resources. The findings indicate a significant positive relationship between public polytechnic students in Southwestern Nigeria's access to and use of web-based information resources, r = .59**, p = .000. Based on this, hypothesis 2 is rejected. This is in line with Igwe and Issa (2017), who advocated that higher educational institutions improve their online teaching facilities, particularly in college and polytechnic libraries, to improve effective access to and use of web-based information resources for academic reasons.

**Conclusion**

Students in public polytechnics in Southwestern Nigeria are increasingly utilizing web-based information resources, including online dictionaries, encyclopedias, Web 2.0 platforms, social media, and online publications. However, the accessibility of these resources is relatively low. Meanwhile, the effective use of these web-based resources is closely tied to students' ICT literacy skills. Therefore, improved accessibility and high ICT literacy skills can enhance the students' likelihood of using such resources for academic tasks.

**Recommendations**

Based on the study's findings, it is hereby recommended that librarians must raise awareness in order to encourage students to use the polytechnic e-library center as their primary source of web-based information resources for

academic tasks. Students, for example, may be made aware of the numerous academic databases to which the polytechnic libraries subscribe, and passwords may be provided. This is because, many polytechnic students are unaware that their institution's databases contain web-based information resources.

In the same vein, polytechnic management should also ensure that high-bandwidth Internet access, uninterrupted power, and working ICT devices, such as desktop computers and laptops, are available for students to use in polytechnic e-library centers. To put it in another way, polytechnic administrators should ensure that their campuses have a long-term Internet/network configuration with sufficient bandwidth, which libraries can use to improve access to web-based information resources. This will encourage students to use computer systems to access and use web-based information resources as well as polytechnic e-library centers as a primary source of information, as not all websites are likely to be accessed via mobile phones, which are popular among polytechnic students. Furthermore, polytechnic libraries should not take information literacy programs at their institutions lightly. Students will be able to navigate academic databases and websites in a variety of settings, including polytechnic e-library centers and devices, in order to access and use web-based information resources for academic tasks. Students could be taught how to access and use information resources in academic databases as part of the user education program.

**Limitations of the study**

Several methodological and contextual limitations apply to research on ICT literacy skills and use of web-based information resources. Because students might lie about their ICT skills or resource utilisation, the study's reliance on self-reported data from questionnaires is likely to introduce bias. Furthermore, both the research and the phenomena under study are limited by gaps in infrastructure and access. One of the popular web-based information resources that the polytechnic students have access to at their free choice was Web 2.0 technologies, particularly blogs and wikis. Wikis and blogs may not provide sufficient information for important scholarly tasks. It is possible that the majority of the polytechnics investigated did not have subscriptions to recognised academic databases, or that students' access to academic databases for their academic tasks was restricted due to a lack of awareness of databases that were subscribed to by their libraries. Even students with adequate ICT literacy skills may not be able to use web-based resources due to these infrastructure limitations, which makes it challenging for researchers to separate the impact of skills from the impact of access.

**Suggestions for further studies**

Further studies could be carried out to investigate the inhibiting factors to accessibility and use of web-based information resources in Nigerian universities.

**References**


1. Abubakar, D. & Adetimirin, A. Influence of computer literacy on postgraduates' use of e-resources in Nigerian University Libraries. Library Philosophy and Practice (e-journal). 1207. (2015). Retrieved Jun. 13, 2016, from http://digitalcommons.unl.edu/libphilprac/1207
2. Akuffo, M. N. & Budu, S. Use of electronic resources by students in a premier postgraduate theological university in Ghana. South African Journal of Information Management, 21 (1) (2019), 1 – 16.
3. Ankrah, E. & Acheampong, E. K. Students' use of electronic resources in University of Professional Studies, Accra, Ghana. Journal of Information Science, Systems and Technology,1 (2) (2017), 11–26.
4. Brar, I. S. Use of web-based information resources and services. Asia Pacific Institute of Advanced Research (APIAR), 2 (2) (2016), 124 – 130
5. Buba, A. A., Abubakar, I, & Yahaya, A. L. Citation analysis of electronic information resources in Master's dissertation in the Department of Geography, Bayero University, Kano. Library and Information Perspective and Research, 1(2) (2019), 15-25
6. Buba, A. A., Song, U. M. & Abdullahi, Z. M. Information literacy skills and use of e-resources by undergraduate students in Nigeria in relation to Kuhlthau's model of Information Search Process (ISP). Library Philosophy and Practice (e-journal). 4992. (2021). Retrieved 14th Dec., 2021 from https://digitalcommons.unl.edu/libphilprac/4992
7. Cantoni, S. L., Jereissati, T. & Lins, L. M. A2I for decent work and economic growth. In Garrido, M. and Wyber, S. (Eds.) 2019. Development and Access to Information. The Hague: International Federation of Library Associations and Institutions. 9–35. Retrieved Aug. 15, 2019, from www.ifla.org. (2019).
8. Chen, B. & Bryer, T. Investigating instructional strategies

for using social media in formal and informal learning. Open Journal Systems. (2012).

9. Devadason, R. P. The State of use of ICT in the teaching and learning of Science and Mathematics among schools in SEAMEO Member Countries. Seameo Recsam. (2010).
10. Emwanta, M. & Nwalo, K.I.N. Influence of computer literacy and subject background on use of electronic resources by undergraduate students in universities in South-West Nigeria. International Journal of Library and Information Science 5 (2) (2013). 29–42
11. Engelhardt, L., Naumann, J., Goldhammer, F., Frey, A., Horz, H., Hartig, K. & Wenzel, S. F. C. Development and Evaluation of a Framework for the Performance-Based Testing of ICT Skills. Front. Educ. 6:668860. doi: 10.3389/feduc.2021.668860, (2021).
12. European Commission. ICT for work: digital skills in the workplace. Final Report. Retrieved Aug. 13, 2019, (2016). from https://ec.europa.eu/digital-single-market/en/news/ict-workdigital-skills-workplace
13. Garrido, M. & Wyber, S. (Eds.). Development and access to information. The Hague: International Federation of Library Associations and Institutions. Pp. 9 – 90. (2017). Retrieved Aug. 15, 2019, from https://da2i.ifla.org/sites/da2i.ifla.org/files/uploads/docs/da2i-2017-full-report.pdf
14. Guthrie, G. Basic research methods: an entry to social science research. New Delhi: SAGE Publications India Pvt Ltd. (2010).
15. Hossain, M. D. A. ICT literacy of information science and library management students in Bangladesh: to what extent informal peer learning has the effect on acquiring the skills? M.Ed. Thesis. Dept. of Education and Technology. University of OULUN YLIOPIST. (2017).
16. Igwe, K. N. & Issa, A. O. Accessibility of resources and delivery methods as correlates of information literacy skills of undergraduates in Southern Nigerian Universities. Afr. J. Lib. Arch. & Inf. Sc., 27 (2) (2017), 159-174
17. International ICT Literacy Panel. Digital transformation: a framework for ICT literacy. A Report of the International ICT Literacy Panel. Educational Testing Service. ETS, p. 1–42 (2007). https://www.ets.org/Media/Tests/Information_and_Communication_Technology_Literacy/ictreport.pdf.Retrieved Jun. 13, 2016.
18. International Telecommunications Union. ICT Facts and Figures, 2016.Geneva: ITU. Retrieved Aug. 11 (2016), 2019, from https://www.itu.int/en/ITU-D/Statistics/Documents/facts/ICTFactsFigures2016.pdf
19. Nunnally, J. C. and Bernstein, I. H. Psychometric theory. New York: McGraw-Hill. (1994).
20. Nwalo, K. I. N. Measures of library effectiveness in Nigerian polytechnic libraries with emphasis on user satisfaction. PhD. Thesis, Dept. of Library, Archival and Information Studies. University of Ibadan. xxiii + 326 pp. (1997).
21. Olatoye, O. I. ICT literacy skills and demographic factors as determinants of electronic resources use among undergraduate students in the University of Fort Hare and Rhodes University, Eastern Cape, South Africa", Doctor of Philosophy (PhD) Research theses, Department of Library and Information Science, Faculty of Social Science and Humanities, University of Fort Hare, Eastern Cape. (2019).
22. Olatoye, O. I., Nekhwevha, F. & Muchaonyerwa, N. ICT literacy skills proficiency and experience on the use of electronic resources amongst undergraduate students in selected Eastern Cape Universities, South Africa. Library Management, 42 (6/7) (2021), 471-479
23. OpenNet Initiative Report of Internet filtering in sub-Saharan Africa.Retrieved Jun. 14 (2010), 2019 from http://opennet.net/research/profiles/Nigeria.
24. Partnership for 21st Century Learning. P21 framework definitions. Washington, DC: P21 21st Century Learning. Retrieved Jun. 14 (2015), 2018, from http://www.p21.org/storage/documents/docs/P21_Framework_Definitions_New_Logo_2015.pdf.
25. Patel, U. Utilisation of web-based information sources and services in engineering college libraries in Charotar Region: a study. Journal of Information Technology and Sciences, 1 (1) (2015), 1 - 9
26. Rainie, L. & Wellman, B. Networked: The New Social Operating System. Cambridge, MA: MIT Press. Pp. 358. (2012).
27. Rassiya, K. & Chinnasamy, K. Information required for e-resources services provided by academic library. International Journal of Interdisciplinary and Multidisciplinary Studies (IJIMS), 1 (6) (2014), 140–146.
28. Shishehgar, S., Dolatian, M., Majd, H. A. & Bakhtiary, M. Socioeconomic status and stress rate during pregnancy in Iran. Global Journal of Health Science,6 (4) (2014), 254-260
29. Soysal, F., Coskun, E. & Alma, B. Proposal of a framework for the Assessment of ICT literacy and examining the structure of high school students' ICT literacy: a case

of Turkey. In Proceedings of the 9th International Conference on Computer Supported Education (CSEDU 2017) 1 (2017), 276-283

30. United Nations Economic and Scientific Cultural Organisation. A global framework of reference on digital literacy skills for indicators 4.4.2. Information Paper No. 51. Montreal. Canada: UNESCO Institute for Statistics. Retrieved Jul. 14 (2018), 2019, from http://uis.unesco.org/sites/default/files/documents/ip51-global-framework-reference-digital-literacy-skills-2018-en.pdf
31. World Bank. World development report 2016: digital dividends. Washington, D.C.: World Bank. 2016
32. World Bank. Gabon: leading ICT connected country in Central and Western Africa thanks to judicious investments. Washington, D.C.: World Bank. Retrieved June 12 2018, 2019, from https://www.worldbank.org/en/news/feature/2018/06/25/gabon-leading-ict-connected-countryin-central-and-western-africa-thanks-tojudicious-investments
33. Yemi-Peters, O. E., Abdulrahman, A. B., Oladokun, B. D. & Ufedo, F. Awareness and access to electronic information resources by students at Kogi State University, Anyigba, Nigeria. Library Philosophy and Practice (e-journal). 7305. (2022). https://digitalcommons.unl.edu/libphilprac/7305 [Retrieved Jan. 5, 2023]
34. Yeşilyurt, E., & Vezne, R. Digital literacy, technological literacy, and internet literacy as predictors of attitude toward applying computer-supported education. Educ Inf Technol. Retrieved Mar. 1 (2023), 2023 https://doi.org/10.1007/s10639-022-11311-1
35. Yilmaz, R. & Yilmaz, F. G. K. Examination of the effectiveness of the task and group awareness support system used for computer-supported collaborative learning. Educational Technology Research and Development, 68 (2022), (2020), 1355–1380. https://doi.org/10.1007/s11423-020-09741-0 [Retrieved Jan. 5, 2023]

## APPENDIX

| Correlations Matrix Table | | | | | |
|---|---|---|---|---|---|
| Kendall's tau_b | ICT Literacy Skills | Correlation Coefficient | 1.000 | .261** | .279** |
| | | Sig. (2-tailed) | . | .000 | .000 |
| | | N | 1387 | 1387 | 1387 |
| | Accessibility to web-based information resources | Correlation Coefficient | .261** | 1.000 | .468** |
| | | Sig. (2-tailed) | .000 | . | .000 |
| | | N | 1387 | 1387 | 1387 |
| | Use of web-based information resources | Correlation Coefficient | .279** | .468** | 1.000 |
| | | Sig. (2-tailed) | .000 | .000 | . |
| | | N | 1387 | 1387 | 1387 |
| Spearman's rho | ICT Literacy Skills | Correlation Coefficient | 1.000 | .366** | .389** |
| | | Sig. (2-tailed) | . | .000 | .000 |
| | | N | 1387 | 1387 | 1387 |
| | Accessibility to web-based information resources | Correlation Coefficient | .366** | 1.000 | .594** |
| | | Sig. (2-tailed) | .000 | . | .000 |
| | | N | 1387 | 1387 | 1387 |
| | Use of web-based information resources | Correlation Coefficient | .389** | .594** | 1.000 |
| | | Sig. (2-tailed) | .000 | .000 | . |
| | | N | 1387 | 1387 | 1387 |

**. Correlation is significant at the 0.01 level (2-tailed).